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Complete Summary of Lake Superior Commerce.

Lake Superior commerce, which had been increasing at the rate of a million tons a year, shows an increase of full two millions in 1897. A report of December commerce is at hand, and by combining monthly statements of the two canals at Sault Ste. Marie, it is found that the total number of vessel passages to and from Lake Superior during 1897 was 17,171, as compared with 18,615 in 1896 and 17,956 in 1895. The number of net tons of freight moved is 18,218,411, against 16,239,121 in 1896 and 15,062,580 in 1895, and the registered tonnage of vessels is 17,619,933, against 17,249,418 in 1896 and 16,806,781 in 1895. Thus the freight moved this year is practically 2,000,000 tons in excess of 1895, although there is a decrease of 1,444 in the number of vessel passages. This statement of canal commerce, which is entirely correct, may be taken as a basis for estimates regarding the capacity of big modern ships with deep draft, as against the smaller vessels of 14 feet draft that were engaged in the Lake Superior trade previous to 1896. Soft coal shipments to all Lake Superior points are only 133,157 tons short of the movement in 1896, notwithstanding the strike and other delays. In the grain movement there is a big shortage, the shipments of grain of all kinds aggregating 76,913,994 bushels, against 90,704,534 bushels in 1896. This shortage in the Lake Superior grain movement is made up, however, by increased shipments out of Chicago. Flour shipments through the canals aggregated 8,921,143 barrels, as compared with 8,882,858 barrels in 1896. The main increase is, of course, in iron ore. The different freight items are enumerated in the following table:

LAKE SUPERIOR COMMERCE--A COMPARISON OF CANAL STATISTICS FOR THREE YEARS PAST.

ITEMS.	DESIGNATION.	Season of 1897.	Season of 1896.	Season of 1895.
Vessels.....	Number....	17,171	18,615	17,956
Lockages.....	Number....		9,466	7,734
Tonnage, registered.....	Net tons....	17,619,933	17,249,418	16,806,781
Tonnage, freight.....	Net tons....	18,218,411	16,239,121	15,062,580
Passengers.....	Number....	40,213	37,066	31,656
Coal, hard.....	Net tons....	536,199	397,210	440,477
Coal, soft.....	Net tons....	2,492,973	2,626,130	2,133,885
Flour.....	Barrels.....	8,921,143	8,882,858	8,902,302
Wheat.....	Bushels.....	55,924,306	63,256,463	46,218,250
Grain other than wheat.....	Bushels.....	20,989,688	27,448,071	8,328,694
Manufactured and pig iron..	Net tons....	135,164	121,872	100,337
Salt.....	Barrels.....	285,449	237,515	269,919
Copper.....	Net tons....	122,324	116,872	107,452
Iron ore.....	Net tons....	10,633,715	7,909,250	8,062,209
Lumber.....	M. ft. B.M.	805,612	684,986	740,700
Silver ore.....	Net tons....	5	240	100
Building stone.....	Net tons....	6,249	17,731	23,876
Unclassified freight.....	Net tons....	579,003	520,851	463,308

Figuring on 40 Knots with Turbines.

Leading journals of England complain of the refusal of the British admiralty to assist in the development of the steam turbine for marine purposes. "It is the general opinion," says Engineering of London, "that the authorities should order a full-sized gunboat fitted with steam turbines, with which it is probable that a speed of 40 knots may be attained, but we are not sanguine that the government, this being a British invention, will take it up until other powers have previously adopted it. In fact, the Russian government has already ordered a turbine boat, which will have a guaranteed speed of 38 knots."

A writer in Industries & Iron, another of the London engineering journals, says: "The application of steam turbines to torpedo boat destroyers, gunboats and cruisers is to be anticipated from their unique capacity for developing great power and high speed with light and compact machinery. Apart, however, from these uses, it appears to me highly probable that they will in time be adopted in the mercantile marine. The conditions in a fast passenger steamer are favorable to the economical application of steam turbines, and in such steamers the smoothness of their running will be a strong recommendation. I see no drawback likely to detract from the advantages which they plainly possess. In applying turbine engines to a large passenger vessel or warship of, say, 30,000 horse power, probably four screw shafts, with two screws on each shaft, would be driven by one compound turbine at a rate of between 400 and 700 revolutions per minute, and the turbines would consist of the high pressure, the intermediate, and two low pressure, each turbine developing approximately one-quarter of the total power. The screw propellers would be about one-half the diameter of ordinary twin-screw propellers, and the aggregate blade area would approximate closely to ordinary practice. With such engines the consumption of steam per propulsive horse power would probably be less than that found in the mercantile marine, and considerably less than that found in engines of war vessels, where space and other conditions must necessarily be considered."

The Messrs. Duntley of the Chicago Pneumatic Tool Co. have had Mr. Henry West of the Cramp ship yard on the lakes showing him tools that are in operation at the works of the Globe Co., Cleveland, and at the Wyandotte ship yard of the Detroit Dry Dock Co.

Question of Grain Shortages.

Considerable interest attaches to a number of suits brought at Duluth against shippers and elevators for shortage in grain cargoes, one of which has resulted in a judgment in favor of the vessel. The result of the appeal in this case will doubtless be determinative of the other cases, and if the action of the lower court in giving relief to the carrier be sustained, presumably many other actions will be brought in that jurisdiction. The shortage during a single year calls upon the vessel owners to pay a large sum of money, and if relief can be had in the Minnesota courts, as the pending action in the supreme court of that state will determine, the "cut throat" bill of lading will lose some of its terror.

In 1895 the circuit court of appeals for the second circuit, in Sawyer vs. Cleveland Iron Milling Co., considered the question, and held the clause, "all the deficiency in cargo to be paid by the carrier (except when grain is heated, or heats in transit), and deducted from the freight, and any excess in cargo to be paid for to the carrier by the consignee," to be good, and the carrier liable for the shortage in the cargo, though the grain had never actually been loaded on board the vessel. It was a case of shipment of grain from West Superior to Buffalo. The grain was loaded at the Great Northern elevator and weighed under the superintendence of a weighmaster for the elevator, the assistant state weighmaster, and a tally keeper for the vessel. Their weight being believed to be correct, Sawyer & Co. surrendered to the elevator certificates for that quantity, and bills of lading based on the reported weight were issued. The cargo on delivery was found to be 1,502 bushels short. The referee to whom the question was submitted found as a fact that the 1,502 bushels had never been put aboard the vessel; that a mistake had been made in the weight.

It will be observed that in this case the cargo was not delivered to the vessel by the consignor but by an independent warehouseman. The consignor, "accepting the receipts of the carrier on the bills of lading as correctly representing the cargo laden on board under the carrier's supervision, relying upon their accuracy and on the clause in the contract, he gave up to the warehouseman, at the elevator, receipts of the latter for a quantity of grain equal to that which the carrier represented that he had received on board. * * * It seems reasonable that parties should agree upon the quantity of grain shipped when the grain is actually delivered to the carrier, not by the shipper out of his warehouse, but by an independent warehouseman in another port, who delivers it on the shipper's order and under the supervision and control of the carrier, in the absence of the shipper or his personal representative. As the language of the contract is broad enough to protect the shipper as well as the consignor against the carrier's mistake, there seems to be no good reason for restricting it."

The court also said: "There is nothing in the bill to indicate that this special agreement shall not apply to mistakes in weighing, arising, as this one apparently did, between the warehouseman and the carrier. Neither authority nor the nature of the business calls for any different construction." The contention was that "deficiency in cargo" meant "deficiency in cargo actually received on board," but it was held not good.

After the decision in this case by the circuit court of appeals was rendered, as above, the owners of the vessel demanded from the elevator the balance of the grain (1,502 bushels) and were refused on the ground that the wheat was weighed out of the elevator by the state grain inspector and for any mistake the state and not the elevator was liable. The vessel owners then brought their action in the state court at Duluth, and Judge Moer, finding that the shortage arose by mutual mistake of the parties, and that the vessel had not in fact received the grain for which her owners had been obliged to pay, held the elevator owner to be liable to them.

The ruling of the circuit court of appeals, between different parties but on the same facts as to shortage, is only in apparent conflict with the decision of the Minnesota court. It will be observed that the court of appeals says: "It seems reasonable that parties should agree upon the quantity of grain shipped when the grain is actually delivered to the carrier, not by the shipper out of his warehouse, but by an independent warehouseman." In one case the vessel owner is at no greater disadvantage, if as great, as the consignor and consignee. When, however, the action is, as in the Minnesota cases, against the shipper who furnishes the grain without the intervention of an independent warehouseman, the reason of the holding seems in a measure to fail. The action of the supreme court of Minnesota will finally determine the question so far as that state is concerned.

A study of iron ore shipments in the tables published last week shows a gain of 27 per cent. over 1896 in the output of all ranges, while the Mesabi range gained 49 per cent. on its record for the preceding year. Yet the Mesabi range, with its output of 4,280,000 tons this year, furnished but 35 per cent. of the total. Counting in last spring's dock stocks of Mesabi ores, and allowing for unsold Mesabi ore brought down the past season, it is estimated that that range contributed close to one-third of the Lake Superior ores consumed in 1897.—Iron Trade Review.

The Bulletin of the American Iron and Steel Association says that the production of pig iron in the United States in 1897 will be not far below 10,000,000 tons, the largest yet attained, and that German production for this year will be the largest ever reached, as also probably that of Great Britain.

The maximum rate of pig iron production in this country—226,024 tons per week—was reached Dec. 1 with 191 furnaces in blast.

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THE

DRY DOCK ENGINE WORKS

WISHES TO ANNOUNCE THAT



EQUIPMENTS

EQUIPMENTS

have been installed or booked for Lake Steamers, representing

60,000 I. H. P.

The total installations throughout the world now amount to

1,600,000 I. H. P.

At present there are

TWELVE STEAMERS

AT DETROIT TO BE EQUIPPED THIS WINTER

SHIPS OF THE UNITED STATES.

SHIP-BUILDING PROGRESS ON THE LAKES IS STILL THE IMPORTANT FEATURE OF GOVERNMENT REPORTS--SUMMARIES FROM STATISTICAL TABLES PUBLISHED BY THE COMMISSIONER OF NAVIGATION.

The annual report of the United States commissioner of navigation, just issued, affords opportunity to present corrected statements regarding ship building in the United States and the tonnage owned in different parts of the country. The tables that follow contain these statistics in detail. A few facts derived from these summaries will prove interesting.

In five years, ending June 30, 1897, 611 vessels of 403,327.91 gross tons were built on the lakes.

During the last of these years (ending June 30, 1897,) more tonnage was built on the lakes than in all other parts of the country—116,937 gross tons on the lakes, against 115,296 gross tons in all other districts.

On June 30, 1897, the number of vessels of all kinds on the lakes was 3,230 and the total tonnage (gross) was 1,410,102.60. The tonnage of the entire country on the same date was 4,769,020.10 and the number of vessels 22,633.

Of the largest type of steam vessels—1,000 tons and over—the lakes have 399 and their aggregate tonnage is 769,366.68; in all other parts of the country there are only 314 such vessels, and their aggregate tonnage is only 685,709.07.

Of steel and iron vessels the lakes have 271. Their aggregate tonnage is 486,291.47, so that the average is 1,745 tons. On the Atlantic coast there are 667 steel and iron vessels, but as their aggregate tonnage is 645,185.80, the average is only 968.

Of the lake cities Cleveland leads with 286 vessels, of 297,698.39 tons. Buffalo has 312 vessels, but their aggregate tonnage is only 193,494.48. The number of vessels listed in the Duluth district has been increasing each year, large additions being made to the tonnage at that point of late through the Bessemer fleet hailing from the head of the lakes. There are now in the Duluth district 111 vessels of 86,244.05 tons.

In the following statistics no account is taken of yachts, lighters, or small boats employed within the harbor of any town or city, nor of canal boats or barges employed wholly upon internal waters of a state; neither do they include barges and boats plying on rivers or lakes of the United States and not engaged in trade with contiguous foreign territory and not carrying passengers. All vessels under five tons net are also excluded:

STATEMENT SHOWING THE NUMBER AND TONNAGE OF VESSELS OF ALL KINDS OWNED IN THE UNITED STATES ON JUNE 30, 1897.

Districts.	Number of vessels.	Gross tonnage.
Atlantic and Gulf coasts.....	16,592	2,647,796.26
Pacific coast	1,581	439,012.56
Northern lakes	3,230	1,410,102.60
Western rivers	1,230	272,108.68
Grand total	22,633	4,769,020.10

Sailing vessels	13,904	1,904,153.42
Steam vessels	6,599	2,358,557.59
Canal boats	650	73,785.95
Barges.	1,480	432,523.14
Grand total	22,633	4,769,020.10

STATEMENT SHOWING NUMBER AND TONNAGE OF VESSELS OF ALL KINDS OWNED IN THE UNITED STATES ON JUNE 30 OF EACH YEAR FOR TEN YEARS PAST.

June 30.	*Sail.		Steam.		Total.	
	Num-ber.	Gross Tonnage.	Num-ber.	Gross Tonnage.	Num-ber.	Gross Tonnage.
1888.....	17,587	2,543,846	5,694	1,648,070	23,281	4,191,916
1889.....	17,699	2,541,924	5,924	1,765,551	23,623	4,307,475
1890.....	17,502	2,565,409	5,965	1,859,088	23,467	4,424,497
1891.....	17,683	2,668,495	6,216	2,016,264	23,899	4,684,759
1892.....	17,991	2,690,504	6,392	2,074,417	24,383	4,764,921
1893.....	17,951	2,641,799	6,561	2,183,272	24,512	4,825,071
1894.....	17,060	2,494,599	6,526	2,189,430	23,586	4,684,029
1895.....	16,686	2,423,159	6,554	2,212,801	23,240	4,635,960
1896.....	16,313	2,396,672	6,595	2,307,208	22,908	4,703,880
1897.....	16,934	2,410,443	6,599	2,358,578	22,633	4,769,020

*Includes unriggered craft.

STATEMENT SHOWING NUMBER AND TONNAGE OF STEAM VESSELS OF 1,000 TONS AND OVER OWNED IN THE UNITED STATES ON JUNE 30, 1897.

Districts.	Number of vessels.	Gross tonnage.
Atlantic and Gulf coasts.....	255	576,010.34
Pacific coast	47	92,333.85
Northern lakes	399	769,366.68
Western rivers	12	17,364.88
Total	713	1,455,075.75

STATEMENT SHOWING CLASS, NUMBER AND TONNAGE OF IRON AND STEEL VESSELS OWNED IN THE UNITED STATES ON JUNE 30, 1897.

Districts.	*Sail.		Steam.		Total.	
	Num-ber.	Gross Tonnage.	Num-ber.	Gross Tonnage.	Num-ber.	Gross Tonnage.
Atlantic & Gulf coasts	31	34,490.34	636	610,695.46	667	645,185.80
Pacific coast.....	1	1,049.24	43	66,422.54	44	67,471.78
Northern lakes.....	62	97,984.33	209	388,307.14	271	486,291.47
Western rivers.....	41	8,273.47	41	8,273.47
Grand total.....	94	133,523.91	929	1,073,698.61	1023	1,207,222.52

*Including barges.

TABLE SHOWING NUMBER AND TONNAGE OF VESSELS OF ALL KINDS OWNED IN THE DIFFERENT CUSTOMS DISTRICTS ON THE LAKES ON JUNE 30, 1897.

PRINCIPAL PORTS OF DISTRICT.	CUSTOMS DISTRICTS.	NUMBER.	GROSS TONNAGE.
Cleveland.....	Cuyahoga.....	286	297,698.39
Buffalo.....	Buffalo Creek.....	312	193,494.48
Port Huron.....	Huron	441	202,946.38
Detroit.....	Detroit.....	286	174,630.85
Milwaukee.....	Milwaukee.....	350	99,115.41
Chicago.....	Chicago.....	251	66,302.69
Plattsburg.....	*Champlain	359	36,429.48
Marquette.....	Superior.....	144	65,971.06
Sandusky.....	Sandusky.....	93	44,126.77
Grand Haven.....	Michigan	261	34,053.93
Erie.....	Erie.....	59	38,595.08
Ogdensburg	Oswegatchie	46	23,014.76
Oswego.....	Oswego.....	45	8,647.67
Toledo.....	Miami	77	26,918.83
Suspension Bridge.....	Niagara.....	8	2,701.97
Burlington.....	*Vermont.....	26	4,524.27
Rochester	Genesee	14	1,000.84
Cape Vincent.....	Cape Vincent.....	59	3,628.20
Duluth.....	Duluth	111	86,244.05
Dunkirk.....	Dunkirk.....	2	57.49
	Total.....	3,230	1,410,102.60

*Largely canal vessels

STATEMENT SHOWING GROSS TONNAGE OF VESSELS OF ALL KINDS BUILT IN THE UNITED STATES DURING TEN YEARS PAST.

Year ending June 30.	On the Great Lakes.	On the New England coast.	On the entire seaboard, including New England coast.	On the Mississippi river and its tributaries.	Total.
1888.....	101,103	33,813	105,125	11,859	218,087
1889.....	107,080	39,983	111,852	12,202	231,134
1890.....	108,526	78,577	169,091	16,506	294,123
1891.....	111,856	105,491	237,462	19,984	369,302
1892.....	45,969	60,624	138,863	14,801	199,633
1893.....	99,271	37,091	102,830	9,538	211,639
1894.....	41,985	28,665	80,099	9,111	131,195
1895.....	36,353	26,783	67,127	8,122	111,602
1896.....	108,782	39,582	102,544	15,771	227,097
1897.....	116,937	21,942	103,504	11,792	232,233

VESSELS OF ALL KINDS BUILT ON THE LAKES DURING FIVE YEARS PAST.

	Number.	Gross Tonnage.
Year ending June 30, 1893.....	175	99,271.24
Year ending June 30, 1894.....	106	41,984.61
Year ending June 30, 1895.....	93	36,352.70
Year ending June 30, 1896.....	117	108,782.38
Year ending June 30, 1897.....	120	116,936.98
Total.....	611	403,327.91

The office of the Marine Review, Perry-Payne building, Cleveland, is the only place where a complete supply of lake charts of all kinds is constantly to be found. Every chart is corrected to date of issue, and the stock includes all publications of the hydrographic office, as well as the charts made by the army engineers corps. The vessel master who has charts published two or three years ago will find new ones of far greater value in the list that has been increased almost every week of late. Prices are those fixed by the government, which do not represent even the cost of paper and printing. Sets of sectional charts of places like Green bay and Georgian bay, which in time past have sold as high as \$15, may now be had on a single sheet at 30 cents to \$1.

An up-to-date lithograph map of the Alaskan gold fields, printed in six colors, complete and accurate. If interested, send five 2-cent stamps to advertising department, Nickel Plate Co., Cleveland. Dec. 31, 1893.

VESSEL LOSSES ON THE LAKES.

NEARLY ALL LOW-GRADE VESSELS—MOST OF THEM CARRIED NO INSURANCE—
ANOTHER SEASON OF PROFIT FOR THE UNDERWRITERS.

Figures relating to the number, tonnage and value of vessels lost on the lakes during the season just closed are practically a duplication of the summary for the previous year. The losses during five years past were as follows:

VESSELS LOST ON THE LAKES DURING THE PAST FIVE YEARS.

Year.	Number of vessels.	Capacity, net tons.	Value.
1897.	35	21,450	\$ 372,900
1896.	35	21,435	386,500
1895.	63	48,975	1,290,100
1894.	54	31,415	522,750
1893.	65	41,625	1,172,200
Total.	252	164,900	\$3,744,450

The season of 1897 has been a fortunate one for lake underwriters. There are no steel vessels in the list of total losses, and the partial losses

The Big Steel Combinations.

Negotiations pertaining to the proposed consolidation of wire and wire rod interests have reached a stage that will not admit of further progress until extensive examinations of plants have been made. The Johnson Steel Co. of Lorain is not a party to the negotiations. The leading concerns have given an option until March 31 on their property at a price. The valuations have been a matter of protracted negotiations and are supposed to be conservative. It remains to be determined now whether the banking interests who are to underwrite the proposed consolidated company believe, after examination, that these valuations are fair and safe. The titles of the properties are now being examined. The appraisers are working on the valuation of the plants and the inventories, and the auditors, Price & Waterhouse, are about to begin an examination of the books for the last three years. This means a colossal amount of work which it will take months to accomplish. It is not believed that this preliminary work can be done before March 1, if so early. Then it remains to be seen whether there is any great disparity between the views of the sellers and the buyer. Until that time all talk that the consolidation will succeed or will fail is a matter purely of conjecture.

A meeting of the members of the defunct steel rail pool to arrange for the final adjustment of some old matters has given rise to reports that a new combination is practically formed. The reports refer to a division of territory and to the assignment of export business to one mill. There

TOTAL LOSSES ON THE LAKES DURING 1897—VESSELS THAT ACTUALLY PASSED OUT OF EXISTENCE.

NAME OF VESSEL.	Type.	Cause.	Date.	Where.	Capacity Net Tons.	Value.	Owned by
Forest, I. M.	Schooner	Stranded	April 16	Pentwater	250	\$ 300	Henry Ceasar, Chicago.
Ryan C. N.	Schooner	Stranded	April 18	Ludington	800	3,500	Samuel Neff, Milwaukee.
Wollin	Schooner	Stranded	April 29	Sheboygan	100	300	Capt. Webb, Milwaukee.
Lookout	Schooner	Stranded	April 29	Two Rivers	400	2 000	Capt. John Olson, Chicago.
Mosher, Alfred	Tug	Fire	May 16	Sturgeon Bay		3,000	Walker et al., Sturgeon Bay.
Irene	Tug	Fire	May 16	Menominee		2,000	Menominee River Shingle Co.
Florida	Steamer	Collision	May 20	Lake Huron	2300	85,000	P. P. Miller et al., Buffalo.
Shickluna, L.	Steamer	Collision	May 28	Long Point	550	12,000	Sylvester Bros., Toronto.
Periwinkle	Steamer	Fire	June 28	Toledo		6,000	Geo. P. Fletcher, Toledo.
Smith, F. M.	Schooner	Stranded	July 11	South Haven	100	800	
Eviston, J. W.	Tug	Fire	July 20	Duluth		1,000	Adaline Smith, Duluth.
Banner, Emma	Schooner	Capsized	August 19	Lake Michigan	175	1,000	Capt. Pederson, Milwaukee.
Alert	Schooner	Stranded	September 15	St. Joseph	50	500	O. B. Green, Chicago.
Kent, H. A.	Schooner	Foundered	September 18	Stanard Rock	1750	17,000	J. B. Gilchrist, Cleveland.
Wallace, C. B.	Steamer	Fire	September 25	Toledo		2,500	M. I. Wilcox, Toledo.
Addie	Schooner	Stranded	October 4	Frankfort	50	500	
Stevenson, Ella	Schooner	Foundered	October 5	Lake Michigan	100	700	John DeYoung, Grand Haven.
Antelope	Schooner	Foundered	October 7	Apostle Islands	1000	7,500	L. S. Boutelle, Bay City.
Hale, E. B.	Steamer	Foundered	October 8	Lake Huron	1450	27,000	Bradley Estate, Cleveland.
Hammond, Nellie	Schooner	Stranded	October 8	White Lake Harb'r	100	500	
Winslow, Kate	Schooner	Foundered	October 14	Lake Michigan	1300	12,000	E. J. Cuyler, Avon, O.
Wells, C. W.	Tug	Fire	October 16	Amherstburg		6,000	
Gifford, F. W.	Schooner	Foundered	October 21	Lake Michigan	1000	11,000	C. W. Elphicke & Co., Chicago.
Barry, Com. Jack	Tug	Fire	October 30	Duluth		5,500	Barry Tug Line, Duluth.
Idaho	Steamer	Foundered	November 6	Long Point	1900	15,000	Western Transit Co., Buffalo.
Groton	Schooner	Foundered	November 11	Lake Erie	650	3,000	J. H. Christie, Detroit.
Dove	Steamer	Fire	November 24	Toledo		8,000	A. Klauser, Toledo.
Nahant	Steamer	Fire	November 30	Escanaba	1600	16,000	C. E. Benham, Cleveland.
Ashley, E. G.	Tug	Fire	November 30	Toledo		2 000	
Paige, Joseph	Schooner	Stranded	December 1	Lake Superior	1200	15,000	John Wedow, Cleveland.
Egyptian	Steamer	Fire	December 2	Lake Huron	1950	35,000	N. S. Whipple, Detroit.
Masten, J. G.	Schooner	Stranded	December 4	Two Rivers	1150	12,500	F. C. Goodman, Cleveland.
Morley, G. W.	Steamer	Fire	December 5	Chicago	1400	55,000	Hawgood & Avery, Cleveland.
Mishicott	Schooner	Stranded	December 6	South Haven	125	800	
Fishing Queen	Tug	Foundered	December 17	Lake Erie		3,000	J. W. Averill, Cleveland.
					21,450	\$372,900	

on steel vessels, due mainly to stranding in the rivers, are certainly no heavier than during 1895 and 1896, notwithstanding the large increase in the number of ships capable of carrying 4,000 to 6,000 tons. It will be noted that the 1897 list of total losses, printed herewith, includes only three or four wooden vessels of even 1,500 tons capacity. The losses are confined largely to low-grade vessels, on which there was in most cases no insurance of any kind. As against the loss during 1897 of thirty-five vessels capable of carrying 21,450 tons and valued at \$372,900, there are now building in lake ship yards vessels capable of carrying about 75,000 tons and valued at about \$3,500,000. Of the thirty-five total losses, twelve were vessels that burned, eleven were destroyed after going ashore, ten foundered and two were lost in collision. The collision losses, both total and partial, were unusually light. The St. Mary's river regulations have undoubtedly had much to do with reducing the number of losses on account of collision.

Herman Johnson, naval architect and marine engineer, has opened an office at 123 Liberty street, New York. In addition to undertaking the work of furnishing designs, specifications, etc., Mr. Johnson will act as agent for ship builders, manufacturers of ship material, machinery and fittings.

A table of figures (pocket size), recently issued by the Bethlehem Iron Co., South Bethlehem, Pa., deals with weights of round steel per running inch, the weights being given for some 575 sizes from quarter-inch to 36-inch.

Holiday rates are available on the Nickel Plate road, Dec. 24, 25 and 31 and Jan. 1, returning until Jan. 4, 1898. 403—Dec. 31

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building, Cleveland.

is no truth in these stories. It is a fact, however, that the rail mills have grown very tired of the war and are yearning for peace. The experience of some who have sold down to \$14 at mill during the hottest of the fight is conducive to a desire for harmony. So general is that desire that mutual concessions will be made more readily than usual, and it is quite likely that some plan may be ultimately agreed to. So far as the general rail trade is concerned the matter is only in its initial stages.—Iron Age.

At the West Superior Ship Yard.

West Superior, Wis., Dec. 20.—Mr. Colgate Hoyt, president of the American Steel Barge Co., was here during the week looking over the ship yard, which, with the large number of vessels that are to undergo repairs, and the new ships on the stocks, presents a more active appearance than for a long time past. Mr. H. C. Coulby, superintendent of Pickands, Mather & Co.'s steamship department, was also here and arranged a number of matters pertaining to repairs that are to be made on vessels of the Minnesota line, as well as those of the barge company. The barge Constitution is in dry dock, having twenty-one shell plates removed and as many new frames and floors. The Victory has a damaged bilge and several damaged frames, with some damage also in the sheer strake. Tugs have been used to clear ice away from the dock, but a channel cannot be kept open for many more days. The Northern Wave will follow the Constitution in the dock and an effort will be made also to dock the barges 117 and 118. In addition to the vessels named there are also in the vicinity of the ship yard the Manda (repaired), barge 202, Sagamore and Columbus. The fleet at Duluth includes the Maruba, Masaba, Manola, Colby, Rockefeller, Pathfinder, 137, Mather, 111, 126 and 127, the three latter loaded with ore that was taken on at Two Harbors, so as to avoid the disadvantages of allowing it to freeze in the dock pockets. The Colby, Manola, Masaba and Maruba are in need of minor repairs, but as the work is all above water it can be done at Duluth.

Around the Lakes.

The first meeting of the Cleveland lodge, Ship Masters' Association, will be held on Friday, the 24th inst.

Kling Bros., boilermakers of Chicago, will build a marine boiler, 7½ by 13 feet, and to be allowed 150 pounds pressure, for the tug W. H. Wolf of the Independent Tug Line.

The Butler & Ryan Co. of St. Paul has secured the contract for improvements costing about \$100,000, to be made in the ore docks of the Chicago & Northwestern company at Ashland.

At the ship yard of the Globe Iron Works Co. today (Thursday) the third of the new lake revenue cutters built by that company for the government will be launched and named Onondaga.

Hingston & Woods, dredging contractors of Buffalo, are about to begin the construction of a large dipper dredge. The dredge will be mounted on a hull 44 by 135 feet and 13 feet deep. The capacity of the dipper will be 10,000 pounds or five tons of material.

The Detroit Dry Dock Co., which secured the contract for a new package freight steamer for the Western Transit Co., will take the steamers Badger State and Empire State in part payment, and it is said that an allowance of \$30,000 will be made for these steamers.

The Pittsburgh, Bessemer & Lake Erie Road has given orders for thirteen locomotives, dividing them among the Pittsburgh, Brooks and Baldwin works. They will be delivered in February. It is the expectation that 1,300,000 tons of ore will be handled at Conneaut next year.

Capt. Patrick Donahue, seventy-three years of age, died at his home in Cleveland, Sunday. At thirteen years he began sailing the lakes, and did not quit active service until five years ago. Among vessels which he sailed in late years were the Chas. Wall, Richard Winslow and Pelican.

A note from Ogdensburg announces that James G. Westbrook has been appointed superintendent of the Ogdensburg Transit Co., with headquarters at Ogdensburg, N. Y., vice Frank Owen, resigned. Mr. Owen will for the present continue to act as general freight agent.

Plans are being made for lengthening the Canadian steamers Sir S. L. Tilley and Seguin during the winter. It is proposed to add 60 feet to the Tilley, which will make her full Welland canal length, 260 feet. The iron steamer Seguin, which is 200 feet long, is to be lengthened about 40 feet.

Railroads running from the Vermilion and Mesabi ranges to Lake Superior ports are said to have earned the following amounts from ore traffic alone during the past season: Duluth & Iron Range, \$2,260,000; Duluth, Mesabi & Northern, \$1,900,000; Duluth, Superior & Western, and Wright & Davis, \$191,000.

During 1897 the side-wheel steamer City of Detroit was in constant service for nine months and seven days, and made 174 round trips between Detroit and Cleveland, traveling 36,540 miles, besides trips to Put-in-Bay and running around while in port, delivering freight, so that in all she must have gone at least 40,000 miles.

The steamer Idaho, sunk Nov. 6 near Long point, Lake Erie, lies in from 48 to 50 feet of water. There is 35 feet of water over the hull and 20 feet over the "arches." The upper works of the vessel have apparently been washed away, but the hog frames (arches) are intact. A buoy was placed over the wreck, but it cannot be expected to withstand the winter's ice.

As the Craig Ship Building Co. of Toledo submitted the lowest bid on the steamer that is to be built for the use of the United States engineer at Buffalo, it is expected that they will be given the contract. The steamer is to be of steel, 70 feet over all, 15 feet beam and 8 feet depth, and will have compound condensing engines with cylinders of 12 and 20 inches diameter and 16 inches stroke.

Low grade ore has been found on the hilltop above Duluth, about five miles from the lake, and considerable has been made of the find. For years float ore has been found in that general neighborhood. Local papers at Duluth report that the ore will be sent from the mines to docks in "chutes." The ingenuity of the newspaper writers is so great that a fall of 500 feet in five miles offers no obstacle to them in the way of sliding ore down by gravity.

General Manager D. Carter of the Detroit & Cleveland Navigation Co. has about completed arrangements for expending \$100,000 for improvements in steamers of that line during the winter. "When I first became connected with this company," said Mr. Carter, in discussing these improvements, "there were not many \$100,000 repair bills for the ships. That was forty-six years ago, and it makes me begin to feel old when I look around and see myself the only survivor of the original company. I can't help feeling just a little bit lonesome."

At Superior on Feb. 4 the property of the West Superior Iron & Steel Co. will be sold at sheriff's sale, preparatory, it is hoped, to reorganization. The debts of the institution amount to about \$1,750,000, which is a good deal more than the property could be duplicated for, it is stated. The bonds are held in large part by John D. Rockefeller, and it has been the fond hope of the people of Superior that he would bid it in and proceed to erect a modern steel plant, but probably nothing is further from his thoughts.

The Schoen Pressed Steel Co. of Pittsburgh is at work on an order for fifty all steel cars for the Pittsburgh & Lake Erie Co. Some of these cars have already been completed and delivered to the road. They are of the same type as the 1,000 all steel cars built by the Schoen Pressed Steel Co. for the Pittsburgh, Bessemer & Lake Erie Co. It is said that other coal and ore roads are preparing to place orders for cars of this kind, and that some coal companies that own large numbers of wooden cars are also figuring on replacing them with the steel cars.

Officers of the Toledo harbor, Association of Masters and Pilots, elected recently, are: Captain, Alex. A. Stevenson; first pilot, Richard M. Quick; second pilot, Homer Durand; clerk and purser, George E. Hardy. Seven other officers are to be appointed by the captain. In the Cleveland harbor, No. 42, Capt. Chas Benham and Frank Place have been nominated for the honor of attending the annual meeting of the

grand harbor, which will take place in Washington, Jan. 17. Officers will be elected by the Cleveland harbor next Monday evening.

William R. Linn is the name selected for the steel steamer building at the works of the Chicago Ship Building Co. for C. W. Elphicke and others of Chicago. The keel length of this ship is 400 feet; length over all, 420 feet; beam, 48 feet; molded depth, 28 feet. The water bottom capacity is figured at 2,400 tons. She will have a quadruple expansion engine. The carrying capacity of the Linn is estimated at 6,000 tons on 17 feet, and she is expected to average twelve miles per hour. The craft will cost complete about \$210,000, and she is to be ready for service by April 1.

Detroit newspapers report that the dry dock company of that city has closed a contract with a syndicate of Puget Sound business men to build for service on that body of water a steel propeller, to be 165 feet over all, 154 feet keel, 27 feet beam and 13 feet deep. Her power will be in a triple expansion engine of 1,000 horse power, steam to be furnished by two boilers at 165 pounds pressure, with Howden hot draft. The vessel will carry 1,000 passengers and 250 tons of freight and will steam sixteen miles an hour. Her draft light will be 8½ feet, loaded 10 feet. Her cost will be about \$75,000. The syndicate was represented by Eugene L. McAllister, formerly chief draftsman of the dry dock company and now of Seattle. The steamer is to be confined to the sound, running between Whatcom, Tacoma and Seattle. The dry dock company has three or four months in which to finish the vessel. She will be built up in the Wyandotte yard, every plate and frame being numbered. When completed in this way the vessel will be taken to pieces and shipped by rail to destination.

General Re-Survey of the Lakes.

Editor Marine Review:—I have just read with interest the article in your issue of Dec. 16, entitled "General Re-Survey of the Lakes," and I hope you will correct a few misapprehensions under which the engineer officer quoted seems to have written his letter. The branch hydrographic offices on the lakes were established, not through the efforts of naval officers, but through the efforts of civilians interested in the lake marine; though, of course, the navy department is always ready to do its utmost in aid of such enterprises. Surveying, even allowing that it "has nothing to do with seamanship," is certainly closely allied to the shipmaster's other art, navigation. The "old school line officer" practically no longer exists in the navy; and the effect of development in the navy has been to make the line officer's duties and knowledge more and more varied; not to crowd him from the quarter deck, but to extend his influence from keel to truck. A study of the naval history of modern times will, I think, convince this engineer officer that marine surveying is quite as much a part of the naval officer's profession as it is a part of that of the civil engineer. The subject of the proper training of young naval officers, which the engineer officer disposes of so easily, is too broad a topic to be treated of here. I may call attention, however, to the widely published appeals of the chief of the bureau of navigation, the secretary of the navy, and even of the president in his last message, for more officers to man the men-of-war now in commission. This should dispose of the proposition of the engineer officer to place naval officers in positions where the duty can be as well, if not better, performed by civilian masters and mates, experienced in the work required of them. What a pity it is that everyone cannot realize the truth of the engineer officer's remark "that every man can attend to his own business better than he can to some other fellow's."

Detroit, Dec. 19, 1897.

HYDRO.

Naval Expenditures and Mercantile Marine.

The British Board of Trade has just issued an elaborate report on the naval expenditure and the mercantile marine of different countries, from which the following figures are taken: The total value of British maritime interests at the present time is estimated at \$10,000,000,000. The imports and exports of France by sea are estimated at \$1,323,500,000, those of Russia at \$364,000,000, and those of Germany at \$2,023,500,000. A note explains that this last figure represents the total foreign trade by sea and land of the German empire. The value of the sea-borne commerce proper of Germany was estimated in 1895 at only \$750,000,000, and it is suggested that the correct figure now would be less than \$1,000,000,000. The sea-borne commerce of Italy is valued at \$272,000,000, that of Spain at \$271,500,000, that of Austria-Hungary at \$102,500,000, and that of the United States at \$1,662,000,000. The naval expenditure of Great Britain, as might be expected, is more than double that of any other country; but, if these figures are correct, it appears that the cost of the navy, regarded as insurance, is only about 1 per cent. of the value of the interests involved, though it amounts to more than 20 per cent. of the aggregate revenue of the United Kingdom, which bears very nearly the whole of the burden. Thus New South Wales contributes \$235,000 to the cost of naval defense out of an aggregate revenue of over \$45,000,000; Victoria, \$350,000 out of a revenue of over \$32,500,000; New Zealand, \$100,000 out of a revenue of nearly \$22,500,000; the South African colonies, nothing—except Sir Gordon Sprigg's offer of a first-class battleship—and the Dominion of Canada, nothing; while out of an aggregate revenue of about \$510,000,000 the United Kingdom spends \$106,250,000 on the naval defense of the empire.

"The story is a pure fake," was what Charles H. Cramp said when shown a dispatch from New York stating that his company contemplated putting \$10,000,000 into a ship building plant at Seattle, to undertake the building of war vessels for the Pacific. He added that the Cramp company has no intention whatever of engaging in the ship building industry at any place other than Philadelphia.

In newspaper dispatches sent out from Cleveland the affairs of an ore pool for 1898 are already discussed, although the ore dealers themselves have not as yet held a meeting.

A celluloid calendar, one of the neatest of the season, is being distributed in a limited way by the Magnolia Metal Co. of New York.

Mr. Parker's Scheme of Minimum Rates.

Mr. A. A. Parker of Detroit is still enthusiastic over the scheme of minimum freight rates on ore and coal proposed at the recent meeting of the executive committee of the Lake Carriers' Association in Cleveland. As chairman of the committee of vessel owners from different parts of the lakes, appointed at the Cleveland meeting, he will make a strong effort to bring members of the committee together before the annual meeting of the association in Detroit, Jan. 19. With this end in view he has issued to all members of the general committee a circular, in which he not only explains what was done at the Cleveland meeting, but also gives his own views on the subject. Most vessel owners are at a loss to understand why Mr. Parker is so confident of success with the minimum rate scheme, in view of the argument against its practicability that is to be met with on all sides, especially from the standpoint that the interests of a 6,000-ton ship and a 2,000-ton ship are far removed from one another, but his efforts to attempt some plan of relief for the owners of several hundred wooden vessels are nevertheless commendable, and it is generally agreed that all vessel owners should give up a part of their time to a systematic consideration of the subject, as there are few fleets that do not include vessels of the kind that are threatened with loss in all future operations. In his letter to members of the general committee, some of whom were not present at the Cleveland meeting, Mr. Parker says:

"The rates most discussed at the Cleveland meeting were those on coal and ore. Thirty cents on coal and 70 cents on ore to and from Lake Superior were suggested. These rates seemed to meet with more favor than any others. It was admitted that we must make a low rate or there would be too much incentive for the vessel owners to cut it, and also that we must not make it so high as to be considered arbitrary by the shippers. Some of the shippers who were talked with outside of the meeting admitted that these would be about fair rates, and they could see no objection to a movement of this kind, provided the vessel owners would stick to it and not break a rate after it had once been agreed to. Last year vessel owners, by competing among themselves, bid the rate down to less than the cost of carrying coal and ore, and nobody was benefited by it. Shippers who have been consulted all agree that the low rates of this past season did not stimulate the movement of freight nor furnish one additional cargo of either coal or ore, and the object of this movement is simply to stop this ruinous competition.

"Some members of the association were afraid a scheme of this kind could not be carried out, for the reason that certain vessel owners were also shippers, and that other owners had interests in common with shippers who favored them with loads. This is no doubt true, but I cannot see where a minimum rate would disrupt any of these arrangements. One friend would still continue to favor another by giving him his business, but it would stop the disadvantage of outsiders bidding a lower rate or in fact making a lower rate for the friend on business that he had to offer. Another suggestion which came from a shipper, was that there should be a maximum rate; that freights should not exceed say 40 cents on coal and 85 cents on ore. But this could not be done. If grain freights should go up to a point above the maximum rates in other lines, whose boats would carry the coal and ore? Another point is that the shipper of ore might say, 'I will have to pay only 85 cents on my ore, and I will wait until fall before I move it, and thus avoid putting money into freights and other charges in the summer time as at present.' In reply to this I would say that the coal and ore shippers could make freight contracts in the spring, to run through the season to Nov. 1, just as they do now, and they could get all the tonnage they wanted at 30 cents on coal and 70 cents on ore to run until Nov. 1. Every vessel owner I have talked with would take contracts of this kind for a portion of his tonnage, and if he wanted to speculate on freights going higher he would have a balance of tonnage to do it with. In this way the shipper would have the same opportunity of covering his sales with season rates that he has at present, and he would know just what the cost would be, as was the case in years gone by.

"My own opinion is that this scheme can be carried out just as easily as any of the other measures that the Lake Carriers have taken hold of and carried out successfully. All that is needed is to be honest with ourselves and with one another, and we can all get these rates and every vessel will carry during the season just as many loads as will be moved under the present system of cheapness with advantage to nobody. Do not throw this letter aside and say the scheme cannot be carried out, but just give it good, careful thought and consideration. Talk with your friends and you will become more favorably impressed as you go on with it. I find this to be true with everybody I have talked with. Then, if you will kindly write me early in January, giving me your ideas regarding the whole matter, I will call the committee together, and I am sure we can formulate a plan that will be acceptable to the association."

A report from the Detroit river postoffice shows a total of over 232,000 pieces of first-class matter handled this season. Of this amount over 181,000 pieces was outgoing mail received from the main office in Detroit, and about 51,000 pieces were received from passing vessels. The Detroit Free Press describes a boat designed by F. S. Gilmartin and Peter Begin of that city for improvement in the river postal service. The delivery to vessels thus far has been accomplished by means of yawl boats, from which lines are thrown to the passing ships, and which act as tenders to the small steam vessel that is used as a floating postoffice. It is impossible to run the small steam vessel close enough to the big ships to effect the transfer of packages. The proposed new boat is to be fast and so designed that she could be handled safely and quickly, but the main feature is to transfer the mail by means of a swinging gaff or crane. The package to be delivered is attached to a hook and pulled out to the end of the crane, which is then swung over the deck of the passing vessel. The delivered package is then detached and the incoming package substituted. The crane is 28 feet long, so that there would be 20 feet clear between the two boats when running alongside of each other.

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404—Dec. 31

Dry Docks Under Discussion in Washington.

Washington, D. C., Dec. 23.—In view of the plans of the present administration to undertake, at an expense of several millions, the building of dry docks and improvement of navy yards in preference to large expenditures on new war vessels, the subject of dry docks, or graving docks, as they are called on the other side of the Atlantic, will receive special attention here during the winter. Members of committees of both the house and senate that are interested in naval affairs are posting up on this subject. Comparatively few persons outside of naval circles have any idea of the immense cost and the great difficulties that are sometimes met with in securing docking facilities for naval vessels. There are in the United States a total of only ten naval dry docks. Their location and dimensions (in feet) is as follows:

	Length.	Breadth.	Depth of sill at high water.
Boston	396.5	60	25
Brooklyn	369.3	66	25
Brooklyn	500	85	25.5
Brooklyn	670	105.2	28
League island	500	85	25.5
Norfolk	331.8	60	25
Norfolk	500	85	25.5
Port Royal	496	97	26.5
Port Orchard	650	92.7	30
Mare island	513	79	27.5

The largest one at Brooklyn, and those at Port Royal and Port Orchard are wooden docks. The one at Boston and the smallest at Brooklyn and Norfolk, and that at Mare island are of granite. The others are Simpson docks. Of these ten docks, only one—that at Port Orchard—can take at present any of the battleships, and all of them together do not equal the number of docks in a single government dock-yard—Portsmouth—in England, where there are no fewer than eighteen. At the Chatham dock yard there are ten docks; at Sheerness five; at Devonport and Keyham eight, and three in process of building.

The largest dock now built in this country is the wooden dock at the Brooklyn navy yard. Its actual dimensions are 670 feet in extreme length, 626.7 at bottom, 105.2 feet in breadth at entrance, and a depth of sill of 28 feet at high water in ordinary spring tides. The total number of dry docks in the world is 748. Great Britain owns or controls nearly 60 per cent. of this entire number; 249 are within the confines of England, thirty in Scotland and eighteen in Ireland. There are 202 docks in Europe, divided among eighty cities; seventy-six in Asia, divided among twenty-seven cities; 136 in North America and adjacent islands, divided among fifty-nine different cities and towns; fifteen in South America, divided among nine cities, and twenty-two in Oceania and Australasia, divided among twelve cities and towns. The docks of Liverpool are the largest and most extensive of any in the world. They cover an area of about 1,620 acres and their quay line measures over 36 miles. This, of course, comprises wet docks as well as dry docks, the total value of the entire system being over \$110,000,000, and steps are now being taken to expend an additional \$15,000,000 in improving and enlarging the system. The docks at London come next in importance, their total area being about 700 acres, the capital represented in which is nearly the same as that for the Liverpool docks—about \$100,000,000. The Southampton docks are noted for having in connection with them the largest single dry dock in the world—a dock that is 751 feet in length, 88½ feet in width and has a depth of 28½ feet. Altogether it is estimated that the dock properties of Great Britain have a value of more than \$1,000,000,000.

Seagoing ships having metal bottoms should be docked three times a year, in order that they may keep clean and retain a moderate speed without an excessive expenditure of fuel. The navy department requires all steel vessels to dock every six months, to be cleaned and painted, and, of course, when on foreign stations these and other vessels are obliged to use the docks nearest at hand and most convenient. Government docks, which are preferred, are not always available, and where a private dock is secured the charges are usually very high, particularly at ports in China, Australia and India. To foreign war vessels visiting the United States and desiring docking privileges, the secretary of the navy issues a special permit, and nothing is charged for the use of the dock itself or for the service of the tug used for helping the ship into dock. Only the actual labor employed and material used is charged for, and a statement of that is furnished the commander of the ship when the work is complete. This general custom, of course, benefits our own ships when abroad.

Wage Advances in the Iron Industry.

Wage advances are one of the best indications of improved conditions; and those that have come in the iron industry in the past month are especially significant, in view of the general agreement that the iron and steel trades have got beyond the point of any considerable price fluctuations. Beginning with a 10 per cent. advance by the Minnesota Iron Co. at its Minnesota and Chandler mines, the movement has included a similar increase at mines on the Menominee range, with the expectation that an announcement will be made soon of a higher schedule for the Marquette range. Though the fall advance in pig iron has slipped away meantime, a 10 per cent. increase in wages at blast furnaces in the Mahoning and Shenango valleys has gone into effect, and at the Jones & Laughlins mills at Pittsburg, day workmen, who compose the greater number of employees, have had a restoration of the 10 per cent. taken from their wages in the early summer. But a matter of greater value, both to tonnage men and day employees in all the rolling mills and steel works of the country, is the steadiness with which plants have been operated in 1897, making it the best year for wage-earners in iron and steel since 1892. What is encouraging for the coming year is that a share of the European money that the railroads and the farmers of the country have been and are now dividing from the harvests of this phenomenal year are to go one step further along the line in 1898 and pass into the hands of the steel masters and the steel workers of the country in 1898.—Iron Trade Review.

All charts sold by the Marine Review are corrected to date of sale.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats.....	416	45,109.47
Total.....	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	1892	1893	1894	1895	1896
Number.....	204	169	175	106	93	117
Tonnage.....	111,856.45	45,968.98	99,271.24	41,984.61	36,352.70	108,782.38
Total.....	861	444,216.36				

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages.....	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered.....	17,219,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation.....	232	231	234	365	365	365

* 1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

Not least among the freaks of the patent office are the models and drawings pertaining to patents of a marine kind. Nowadays the routes for the big steamers crossing the Atlantic are laid as if they were actual tracks. These courses are followed closely by all of the liners, but Reuben H. Plass of Brooklyn proposes to make the way much clearer. He would mark this transoceanic highway with a series of small floating light-houses a few miles apart. These light-houses will be somewhat like exaggerated buoys, each one bearing a light-beacon so arranged as to require attention only once in four months, not to mention a foghorn, which, worked by compressed air stored by the wave-rocking, will bellow warning blasts for the benefit of mariners. Anybody who may happen to be shipwrecked within reach of this line of floating and anchored stations will be guided to the nearest one by the light and the sound of the foghorn. Gaining admittance to the interior of the big buoy by opening a keyless door, he finds food and shelter there. The act of opening the door sends an alarm by wire along the line of stations. At intervals of fifty miles are central stations, manned and provided with lifeboats, and rescue is at once sent.

Shipping firms controlling more than 100,000 gross tons in sea-going ships are rare. England has half a dozen—the Peninsular & Oriental with sixty ships of 283,140 tons; British India, ninety-seven ships of 251,430 tons; Wilson line, eighty-two ships of 159,800 tons; Pacific Steam, forty-one ships of 128,400 tons; Cunard, twenty-seven ships of 119,500 tons; White Star, twenty-one ships of 114,290 tons. Germany has only three, but now holds the record for the largest steamer, the largest sailing-ship, and the largest tonnage controlled by one company. The Hamburg-American has sixty-nine ships of 286,950 tons; North-German Lloyd, sixty-seven ships of 265,600 tons; Hamburg and South American, thirty-two ships of 100,650 tons. France has but two—the Messageries Maritimes, with sixty-three ships of 229,850 tons; and the Compagnie Generale Transatlantique, with sixty-four ships of 166,700 tons. Italy, Austria, Spain and Japan have one each. The United States has none.

Just previous to adjournment for the holidays, the senate committee on naval affairs discussed informally the plans of the navy department for the increase of the number and the improvement of the existing dry docks on the lines of the bill recently introduced by Senator Hale, but took no action beyond authorizing Senator Hale to confer with the house naval committee with the view of securing joint action of the two houses on any line of action that might be decided upon. There was a general expression of opinion favorable to the increase of the country's docking facilities. The present indication is that legislation in this direction will be attempted in the naval appropriation bill. The committee also discussed at some length the question of armor plate, and decided to invite Secretary Long to appear before the committee at any early date and explain the status of the department's efforts to secure lower prices on the manufacture of plate.

A proposition of the Union Iron Works is being considered at the navy department for establishing a central electric power plant on board the battleship Wisconsin, similar to that installed on the Kearsarge and Kentucky, which will turn the turrets, drive the ammunition hoists and all auxiliary apparatus excepting the windlass and steering gear. The plant will also furnish the power for lighting the vessel. A contract was

recently made with the General Electric Co. for substituting hydraulic power on the Illinois and Alabama. The proposition of the Union Iron Works, if adopted, will result in the additional expenditure of \$60,000.—Army and Navy Journal.

Another test of the submarine boat Argonaut, designed by Simon Lake of Baltimore for the purpose of finding sunken vessels, removing their cargoes and raising them, took place at Baltimore on Thursday last. After the vessel had been cruising under water in the river at a depth of about 20 feet for nearly an hour, a diver left her through one of the forward compartments and returned through the conning tower. On a second trip the vessel was under water for more than an hour, and a small party aboard was treated to a meal cooked in the submerged craft. This vessel was built by the Columbian Iron Works of Baltimore and is owned by the Lake Submarine Co. of Newark, N. J.

The navy department has been so favorably impressed with the result of the experiments made at the New York navy yard with petroleum as fuel for small boats that it has given orders for a trial on a larger scale of two distinct systems. The torpedo boat Stiletto, at the New York navy yard, is to be fitted up with a system of burners through which the oil is fed into the furnace by blasts of compressed air. At the Norfolk navy yard, a corresponding craft is to be fitted with a system which uses a steam blast to evaporize and burn the oil, and a comparative test will be made of the two methods.

It is certainly a big ship building establishment that in a single year launches ten steamers of 84,240 tons. This is the 1897 record of Harland & Wolf of Belfast, Ireland, the firm that also led British ship builders in 1896, when they launched 81,316 tons. Of the ten vessels launched this year, three are over 10,000 tons, namely, the Cymric 12,340, the Brasillia 11,100 and the Briton 10,248 tons. All of these are twin-screw steamers, but only one of them, the Cymric, has quadruple expansion engines.

Ten years ago the total output of iron ore from the Lake Superior region was 4,742,276 tons, and it was then said that the maximum had been reached for a great number of years to come. With an output of about 12,500,000 tons in 1897 the figures of ten years ago will be nearly trebled. Comparisons of this kind are enough to give credence to the most extravagant predictions as to the quantity of Lake Superior ores that will be needed to meet the normal demand in the years immediately before us.

C. P. Huntington, founder of the town of Newport News and owner of the ship building plant at that point, is said to be arranging for the purchase of property adjoining the ship yard and having half a mile of water frontage. These negotiations have again revived the rumor of a deal between Mr. Huntington and the Armstrongs of Newcastle, England, for enlargement of the Newport News works on a big scale.

Officers and directors of the reorganized Detroit & Cleveland Navigation Co. of Detroit are: President, Hon. James McMillan; vice-president, Hugh McMillan; treasurer, Wm. C. McMillan; secretary and general manager, D. Carter; directors, Hon. James McMillan, Hugh McMillan, Wm. C. McMillan, D. Carter and Geo. Hendrie.

The largest dry dock in the world is the Prince of Wales dock at Southampton, England, which is 750 feet long by 87½ feet wide at sill and 91 feet at cope level. It is possible to lengthen this dock to 1,000 feet should the size of vessels ever demand it in the future.

On account of the necessity for prompt action the United States senate passed a bill in a few minutes the other day, authorizing the secretary of the treasury to purchase or have constructed a suitable vessel for revenue cutter service on the Yukon river. An appropriation of \$40,000 for this purpose was made available immediately.

Great Britain now has in service or in course of construction no fewer than ninety-five torpedo boat destroyers, and all of the latest are of 30 to 33 knots speed.

A large double-end ferry boat for service across the bay at San Francisco will be built by the Union Iron Works of that city.

Stock of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Dec. 18, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago.....	7,793,000	16,795,000
Duluth.....	1,295,000	1,374,000
Milwaukee.....	143,000	75,000
Detroit.....	194,000	139,000
Toledo.....	276,000	345,000
Buffalo.....	2,512,000	2,724,000
Total.....	12,213,000	21,452,000

As compared with a week ago, the above figures show, at the several points named, an increase of 1,540,000 bushels of wheat and a decrease of 511,000 bushels of corn. On the same date there was afloat on the lakes 1,292,000 bushels of wheat, 908,000 bushels of corn and 485,000 bushels of oats. Grain afloat on the canals aggregated 46,000 bushels (oats).

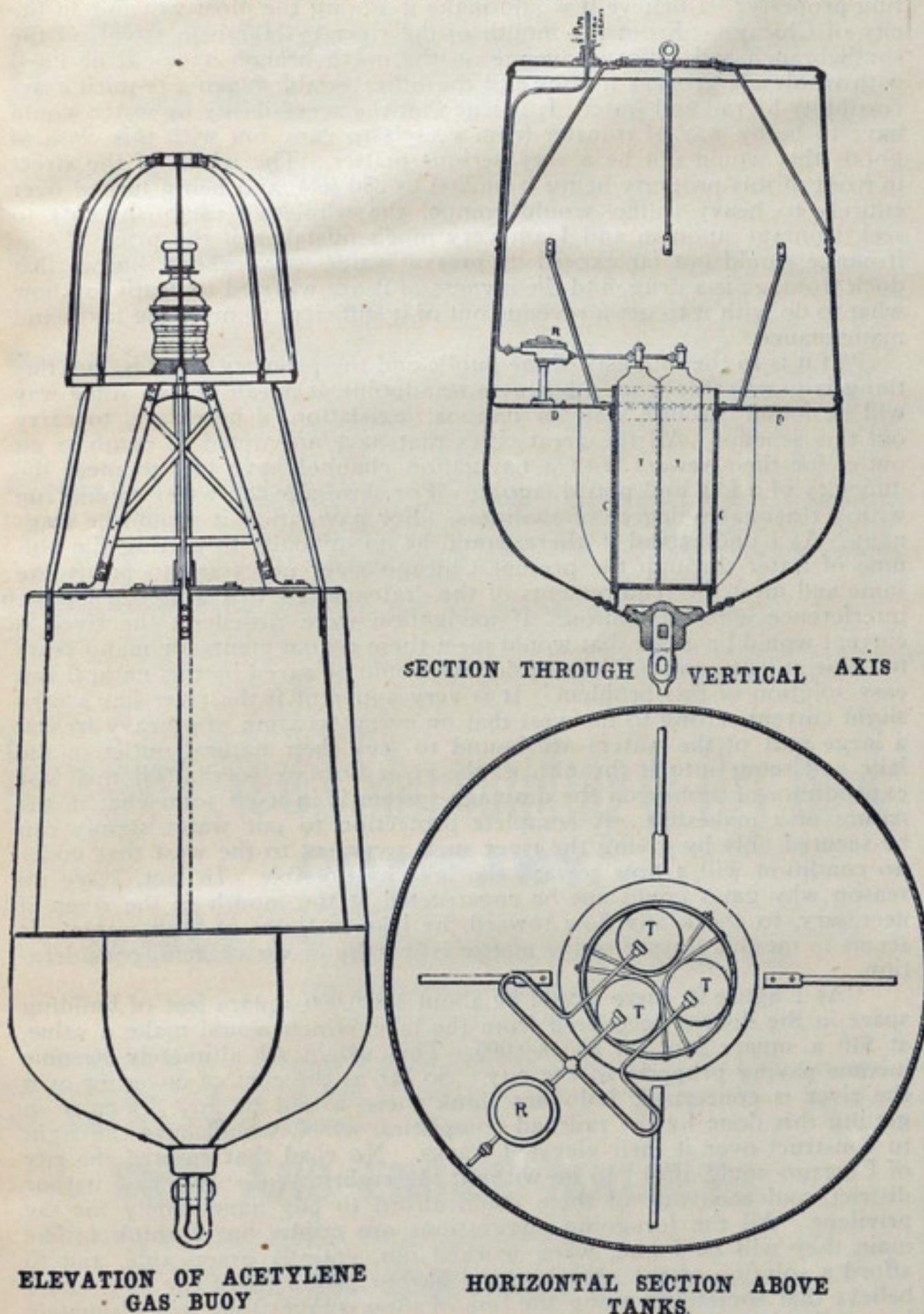
The Daimler Motor Co., Steinway, L. I., will have a large exhibit of marine motors, launches and motor vehicles at the fourth annual sportsmen's exhibition and bicycle show, Jan. 13 to 22, at Madison Square Garden, New York.

All charts sold by the Marine Review are corrected to date of sale.

Experimental Acetylene Gas Buoy.

Lieut.-Col. D. P. Heap of the United States engineer corps has been making experiments at New York, under direction of the light-house board, with an acetylene gas buoy which he has designed for river and harbor service. If this kind of buoy proves successful, the light-house service expects to derive advantage from reduction in first cost of gas-lighted buoys and also a large increase in the power of the light. Alike to the Pintsch gas buoy, this new type of buoy will, of course, be more reliable than electrically-lighted buoys. If one of a chain of the latter goes wrong, all the others are affected; whereas the acetylene buoy, being an independent and self-contained unit, will not affect any other buoys by its failure.

Col. Heap has given the Scientific American an account of experiments thus far made with his buoy. In order to save expense in carrying out these experiments, a first-class can buoy was pressed into service and modified for the tests. A cylinder C C of boiler iron, closed at the bottom



but open at the top, was attached to the diaphragm D of the buoy and firmly supported at the lower end. In this cylinder were placed and securely fastened three tanks T T T containing each about 20 pounds of liquefied acetylene gas under a pressure of 600 pounds to the square inch. These three tanks are connected by piping to the regulator R, which reduces the pressure to that of a 2-inch water column. From the regulator a pipe leads to a Naphey burner, so placed that the flame will be in the focus of a lens lantern provided with cut glass prisms, so as to concentrate the light in a horizontal plane. The candle power of the burner is twenty-five. This is increased by the lens lantern so that the emergent beam is about 230 candle power. One pound of liquefied acetylene will expand to 15 cubic feet of gas; so the charge in this buoy equals 900 cubic feet. As the burner consumes a little less than 1 cubic foot per hour, the buoy should burn continuously for at least nine hundred hours.

On Oct. 30 the buoy was lighted and placed in the water near the north dock at the New York light-house depot. It burned continuously until Nov. 10, when it was taken up and placed next day near Bay Ridge for convenience of examination by the light-house board. On the 12th it was replaced in its former position and continued to burn brilliantly until Nov. 26, when the light began to grow less bright. The buoy was taken up, and an examination of the burner showed that carbon had deposited at the orifice. This was probably due to the burner being defective, as other burners of the same type had given far better results. The cost of the gas consumed in this trial was about one cent per hour, which is a remarkably low figure, especially in view of the brilliance of the light. Experiments have also been carried out with liquefied acetylene gas for beacon lights, and it gives promise of equally good results in this direction.

The light-house board considers these tests so successful that additional and more severe experiments are to be made with an acetylene gas buoy moored near the entrance to Gedney's channel and with an acetylene gas-lighted beacon on Romer shoal. The same buoy will be used, such modifications being made as have been suggested by the Bay Ridge experiments.

The Day of the Clipper Past.

"Stunsails out of fashion!" said the Old Skipper, as he puffed vigorously at his old clay pipe, which has been around the Horn almost as many times as its owner. "Well, they may be; but it is because financial economy has abolished them on American ships. However, an old shipmate of mine, who is a bit of a crank, and left this port the other day, still carries a topmast stunsail. It may be for sentimental reasons, just as a Confederate veteran might display the flag under which he went to battle. But stunsails are just as practical today as ever. 'Studding sail,' you say? Oh, yes; studding sail may be literally correct, but Jack says 'stunsail.' He objects to mouthing participles and words with long endings. He wants brevity all the time. The corruption of language by sailors is proverbial. Stunsail may be a corruption of studding sail; but studding sail itself is a corruption of steady sail, or steering sail, which, in my opinion, was the original term. The stunsail, although used only in moderate weather, was a driving sail. Our yachts carry stunsails today in the form of the immense side sail that is called the spinnaker.

"It costs to fit a ship with a suit of stunsails. Their use means extra labor for the crew, or a larger crew, and their storage takes valuable cargo room. This means expense for the ship, which her earnings in these days of railroads and tramp ships do not warrant. The cargoes that sailing vessels carry today do not demand quick transportation, with its high freight rates. The modern sailing ship is little better than a floating warehouse. It is not driven; spars and canvas are not pressed as they were before the advent of the steamship. Sailing a ship to make a short passage is one of the lost arts. There is no demand for auxiliary canvas such as stunsails. The Yankee clipper is out of it—defunct. Away back in the middle of the century the stars and stripes floated over ships that were really clippers, below and aloft. In competition with one another and with foreign craft our clippers carried valuable cargoes—tea from China, coffee from Rio and fancy merchandise to San Francisco. The steamships do the tea and coffee carrying now. It was not in those days a go-as-you-please run. The clippers were under orders to get there to catch the top of the market. Hours saved on their voyages, long though they were, meant many dollars for all concerned. Ships were driven then with canvas that fairly smothered them in fair weather and foul, and Yankee seamanship, with its characteristic judgment and nerve, was recognized and rewarded. But all this is merely a memory now. I can fancy the clipper of the fifties coming head-on, rising against the clear sky of the lower latitudes, her sails mounting above the blue horizon, tier upon tier—sky-scrapers, moonrakers, cloudcleaners—a snow-white pyramid, an angel's footstool, as Jack says. Did they carry stunsails? Aye, up to the royal yards!"—New York Sun.

Curious Accident to Engines.

A curious accident to the engines of a steamer belonging to an English line has come to our knowledge. On the voyage out the high pressure cylinder of a set of triple expansion engines developed a peculiar and most pronounced knock. The engineer had the covers removed twice, but failed to discover the cause. Nothing was found in the cylinder, and the piston, piston rings and rods were found to be intact. On starting again, the knock was pronounced, and continued to get worse, until, after some hours of steaming, a crash was heard inside the cylinder, and the engines were entirely disabled. The removal of the cover a third time revealed a different state of things, for a portion of the piston was broken clean off. A minute examination of the engine showed that the pounding in the first place had been caused by the cylinder liner which was secured at the top end by counter-sunk bolts inserted from the inside. A slight amount of vertical play of the liner seems to have gradually grown into an appreciable movement, which eventually sheared off one of the bolts. This coming into contact with the cover on the upward stroke caused a fracture of the latter, the broken piece falling to the bottom, with the result above stated. The engineer was held responsible for the accident for not shutting down the high pressure cylinder, as the engine might have been run temporarily as a compound by working the intermediate and low pressure cylinders only.—Engineer, London.

The Yantic in Lachine Canal.

The Michigan naval reserve steamer Yantic, now at Detroit, appears in the accompanying engraving, which was made from a photograph taken in the Lachine canal, Nov. 22, and for which the Review is indebted



to Mr. F. E. Dunbar. The Yantic, dismantled and lifted on pontoons for her journey through the Canadian canals from Montreal, is being towed stern first.

TO CLOSE UP THE RIVER.

ANOTHER BIG PROBLEM UNDER DISCUSSION IN CHICAGO—DIFFICULTIES THAT WILL SOON BE ENCOUNTERED IN THE CROWDED RIVERS AT OTHER LAKE CITIES.

Chicago, Ill., Dec. 21.—When Mr. Yerkes of street railway fame proposed to close up the Chicago river and organize a company with ten millions capital to construct docks on the lake front, his scheme was looked upon as nothing more than a novelty, but it has again stirred up in Chicago the interests that are in no way connected with lake shipping. This oppositon has claimed that all improvements in the Chicago river are makeshifts and that the great growth of the city and congested condition of the main business districts demands the abandonment of the river. Mass meetings have been held in various parts of the city and resolutions adopted in opposition to further expenditures on river improvements. A radical measure of relief from the disadvantages of draw bridges and a divided city is demanded. But the shipping interests are going ahead with their plan of securing a large appropriation from the present congress for lowering tunnels and for widening and deepening the river. They know that the schemes proposed by the opposition are too big to admit of serious consideration at this time. Still there is a great deal of solid reasoning in the claim that Chicago has outgrown the river and that the city must soon meet the great problem with which it is confronted in this regard. A discussion of the subject by Mr. Alexander Clark is very interesting. Mr. Clark says:

"I think it is very plain to anyone who has given the matter any consideration that the city of Chicago cannot remain forever divided like all Gaul into three parts, and that ultimately the separation caused by swinging bridges will be abolished. I have seen 300 people standing shivering on one of the bridge approaches waiting for a schooner loaded with a cargo of bark or ties manned by three or four sailors to pass through. The time lost by these people, if figured up, would go a long way toward buying the whole cargo. So far as the lumber interests and crude and cheap material are concerned, I have no doubt but that the loss of time and the interference with traffic caused by opening the bridges to allow this business to be carried on along the river would pay a dozen times over the profit from it, and if it were practicable it would pay to subsidize these people to carry on their business somewhere else. I have no doubt the expense of getting stuff up the river will ultimately force this business into the Calumet. As the city becomes more congested the loss and aggravation of this interference to traffic between these divisions will become greater, and any thoughtful person can foresee that ultimately the nuisance will become unbearable and a way will be found or made to obviate it.

"That steps should be taken before any large expenditure is made, as a mere makeshift, is evident. Radical changes are now proposed, seeming to be based upon the supposition that this river will always remain open to navigation. Of course these changes are largely advocated by interested parties (the owners of dock property and the tug men seem to be their most untiring friends), but in a matter of this importance the interests of no special class but of the city as a whole should be considered. Take the area in front of the city of Chicago, extending from Van Buren street to Indiana street, a lake frontage of about one mile. Take an area of the lake opposite this as nearly rectangular as possible, three-quarters of a mile in width. Inclose this area with a substantial breakwater, and devote the east one-quarter of a mile in width to an outer harbor and the inside one-half mile width to a system of docks. These docks could run at right angles to the shore. They might consist of a series of slips one-half mile in length, running east and west 200 feet in width. Between each slip there could be a strip of land made 300 feet wide. In the center of this strip there should be a street 100 feet wide, giving 100 feet on each side of it for wharfage and buildings. This system of slips would give just about ten miles of dockage. These slips could be dredged out to a depth of 25 to 30 feet, and the foundations of the buildings and the piling go down below the bottom of them. This would allow craft drawing probably as much water as will ever sail the lakes to go in and out of them with comfort and rapidity, and with very slight towing expense. Then, take down the bridges and cover over the present river from the point where this outer harbor commences. This covering should be on the present grade of the streets. Turn the present river and its approaches into a great heavy traffic thoroughfare, 250 feet in width in the business center, and from 150 to 250 feet in the branches, and this would meet the objection that the outer harbor would be inaccessible to heavy traffic. Over this thoroughfare build a system of elevated tracks and give every steam road that enters the city of Chicago the right to transfer its freight cars by electricity over the same. This thoroughfare should be connected with all the streets on the slips, so that teams could pass without any bridge interference to every building in the harbor, and a system of elevated tracks should be carried over these tracks. Along this thoroughfare would soon locate all the wholesale houses that do a large transfer business. Any line of business that gets its goods direct from vessels, such as grain, could locate along the slips. The wholesale houses that are now compelled to transfer goods by teams from freight depots could have them put down directly into their own establishment from the cars, and such a plan would at least rid the central business district of about four-fifths of the congestion and discomfort of heavy teaming, and would enable its streets to be paved with asphalt and give pedestrians a show for their lives on them.

"I anticipate two sets of objections to the practicability of this scheme: First, business objections; second, legal objections. As to the business objections, I do not think they should have much weight. In my judgment, this thing is not a matter of choice with the people of Chicago, but of necessity. Even if it were possible to maintain the depth of water and present freedom from obstruction to navigation of the river, yet the complications and expense incident to it will always have a tendency to drive traffic to more accessible and convenient harbors. Unless the old city takes steps to make some more convenient facilities for the heavy shipping, it is bound to drift to South Chicago. I do not think under any circumstances it would be possible or advisable to hold the coal and lumber

interests. Land is getting too valuable along the Chicago river front to be used for these crude lines of business, and, as I have already said, access to these yards is getting so complicated, tedious and expensive that, in my judgment, they will soon be driven to South Chicago or to Waukegan. The principal other lines of business having use for water transportation are warehousing, general merchandising and the grain trade. As far as warehousing and grain trade are concerned, if railroad connections could be given them, a lake front site would suit them much better than the present river connection, and about the only loss would be the change of buildings; but in a city where structures that were considered business palaces in 1873 are being ruthlessly torn down to give place to more modern ones, the change of the buildings should not have much weight. Many of the grain warehouses could still be retained for storage purposes. The storage warehouses could be changed without much difficulty into manufacturing or business blocks.

"What effect would this closing of the river have on the value of abutting property? I believe it would make it among the most valuable in the city of Chicago. From the mouth of the river to Harrison street on the south branch and Chicago avenue on the north branch it would be lined with wholesale grocery houses and the other establishments requiring accessibility by rail and water. It is true that the accessibility by water would have to be by way of transfer from vessels to cars, but with this class of goods this would not be a very serious matter. The width of the street in front of this property being from 200 to 250 feet, and being turned over entirely to heavy traffic, would compel the wholesale establishments to seek frontage upon it, and I am very much mistaken if the price of this frontage would not far exceed its present value. Everybody knows that dock frontage is a drug, and the owners of it are worried to death to know what to do with it to get a revenue out of it sufficient to meet the taxes and maintenance.

"If it is to the interests of the public and the property owners, and this thing is practicable from a business standpoint, it is safe to say some way will be found through state or national legislation, if necessary, to carry out this scheme. All the great cities that have attempted to combine an outlet for their sewers with a navigation channel have had to meet the difficulty of a foul and putrid lagoon. For sewerage the water should run with a reasonable degree of swiftness. For navigation it should be stagnant. As I understand it, there would be no difficulty in getting the volume of water through the present Chicago river necessary to purify the same and meet the requirements of the drainage law if it were not for the interference with navigation. If navigation were closed on the river, a current would be given that would meet these requirements for many years to come at least, and millions of dollars would be saved by this natural and easy solution of this problem. It is very apparent if the river has a very slight current setting to the west that on every occasion of a heavy freshet a large part of the waters are bound to seek their natural outlet in the lake and scour into it the filth of the river bottom, so that all this vast expenditure of money on the drainage system is in itself somewhat in the nature of a makeshift. A complete protection to our water supply can be secured only by giving the river such a current to the west that under no condition will a flow toward the lake be possible. In fact, I see no reason why gates could not be constructed at the mouth of the river, if necessary, to check any flow toward the lake in times of high water. It seems to me this feature of the matter is worthy of very careful consideration.

"As I figure it, there would be about 5,000,000 square feet of building space in the district recovered from the lake, which would make a value, at \$10 a square foot, of \$50,000,000. This would all ultimately become income-paying property to the city. So far as the cost of covering over the river is concerned, I do not think there would be any difficulty in getting this done by the railroad companies, which would have the right to construct over it their elevated tracks. No road that entered the city of Chicago could afford to be without the right to enter this new harbor district, and each one of them could afford to pay handsomely for the privilege. All the foregoing suggestions are crude, but I think in the main they will be found, when worked out, entirely practicable, and to afford a solution of the sewerage and harbor problems of the city, and I believe that something along the line of these suggestions will ultimately have to be done."

The Frontier Iron Works of Detroit is introducing an improved upright gasoline engine for 10 horse power or less, and it will be placed on the market within sixty days. For plants requiring from 10 to 100 horse power, the standard Hicks compound engine will still be sold. The Frontier company is now prepared to furnish estimates for gas and gasoline engines for all purposes.

Iron-clad paint is used by a dozen leading railroads of the west, among them the Northern Pacific. The different brands contain from 60 to 93 per cent. iron ore, which is not burnt or calcined. For further particulars address the Iron Clad Paint Co., 22 Case building, Cleveland.

About 1,800 people were present at an oyster roast given by the Berlin Iron Bridge Co. at their works in East Berlin, Conn., on the 15th inst. Oysters for the occasion were procured in car loads.

Luce's "Seamanship" has been a text-book at the United States naval academy for the past thirty years. It is being used by naval reserve organizations all over the country. It is a standard work, selling at \$10, and will be mailed to any address at that figure by the Marine Review, 409 Perry-Payne building, Cleveland.

U. S. ENGINEER OFFICE, DULUTH, MINN.,
Nov. 30, 1897. Sealed proposals for building substructure for south pier, Duluth Ship Canal, will be received here until noon, Jan'y 15, 1898, and then publicly opened. Information furnished on application. Clinton B. Sears, Major, Engrs. Jan. 15

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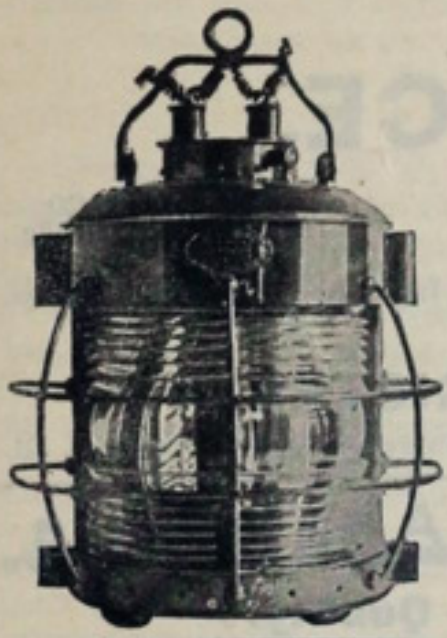
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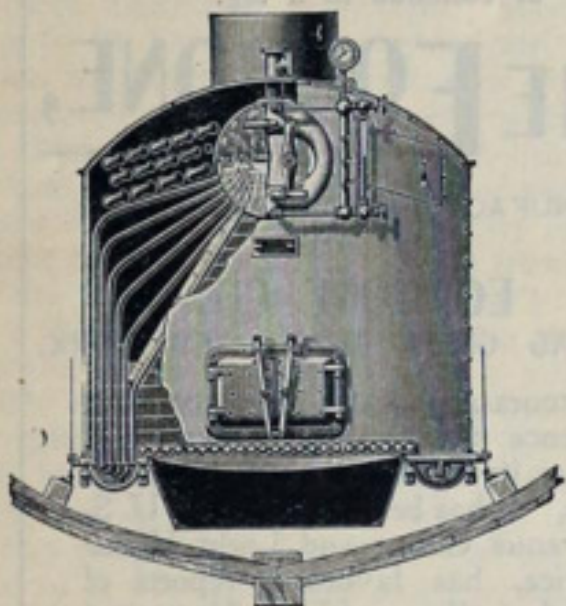
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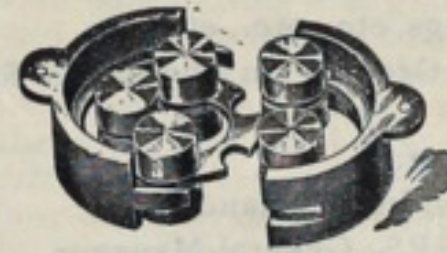
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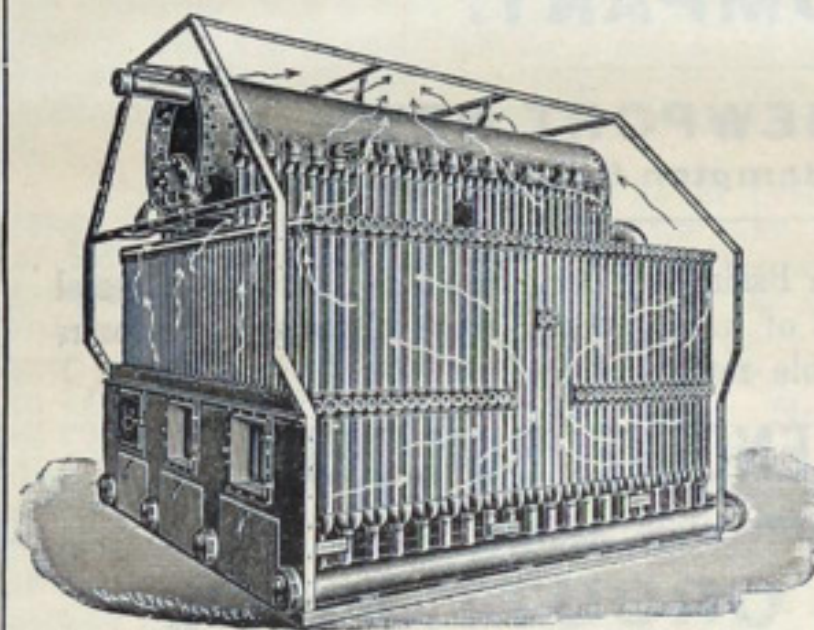
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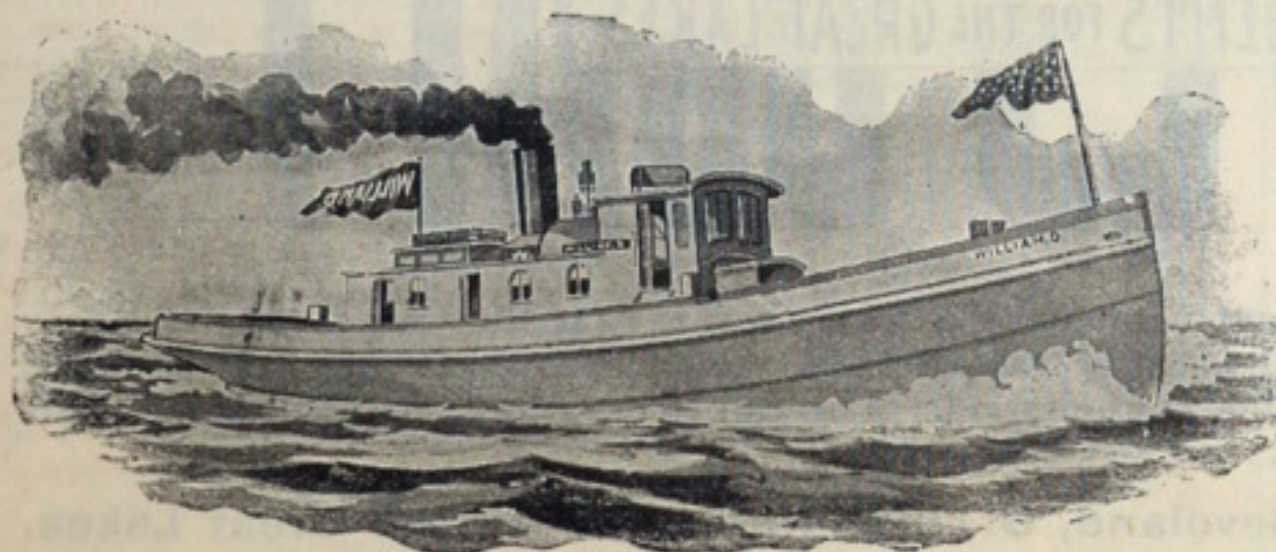
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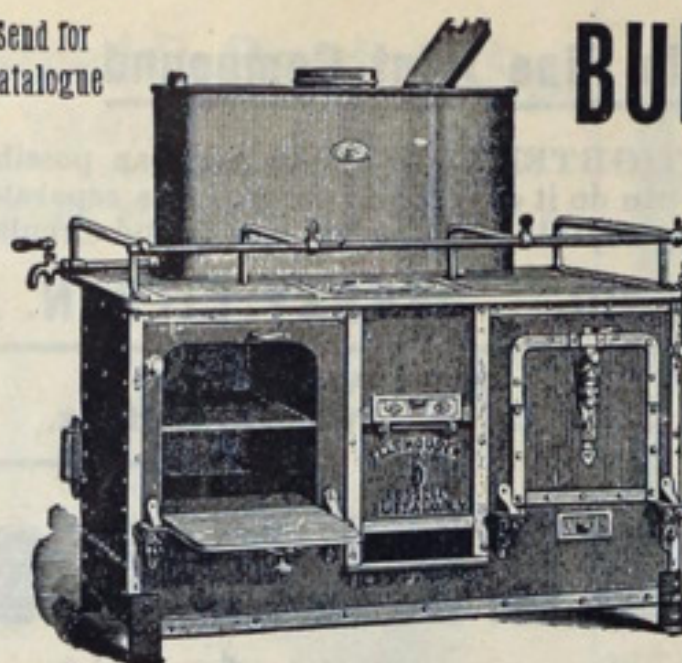
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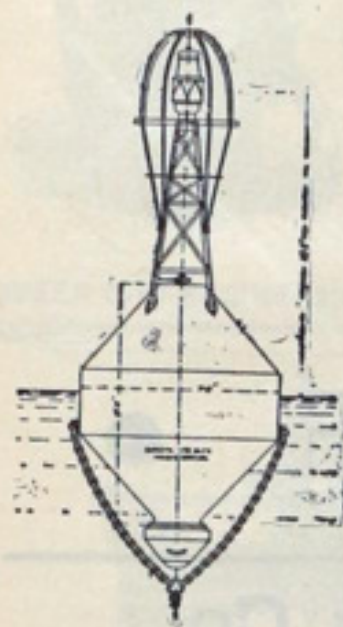
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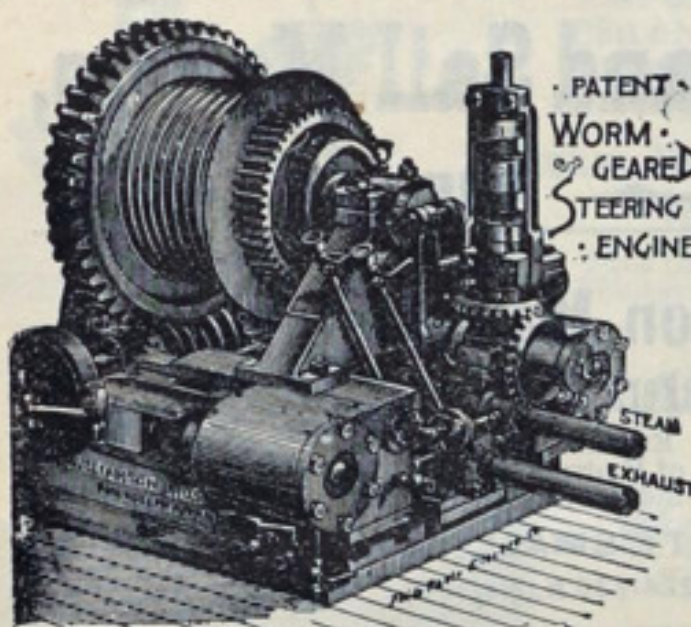
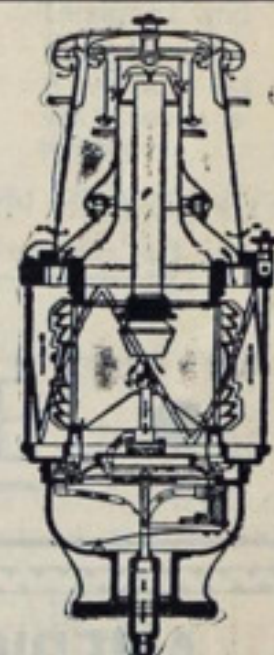
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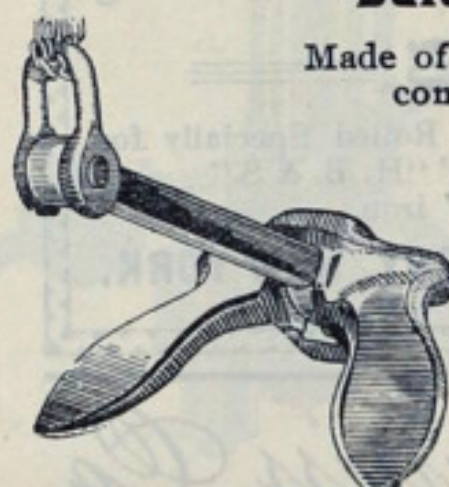
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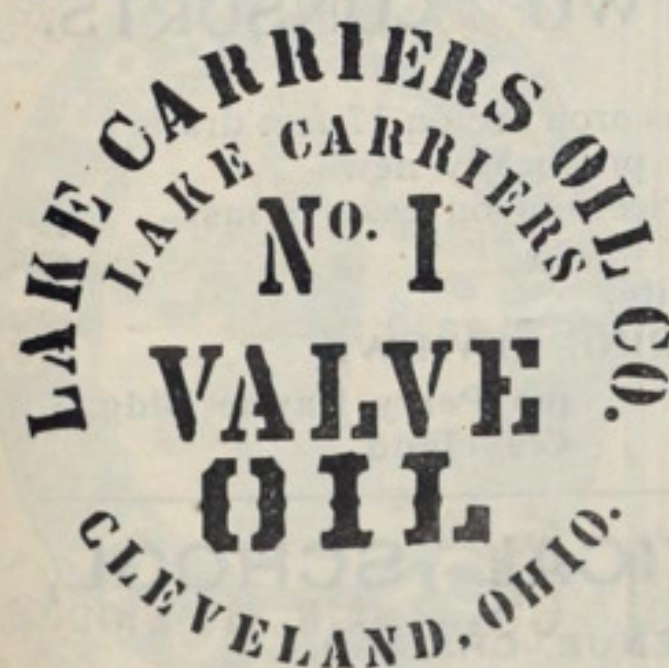
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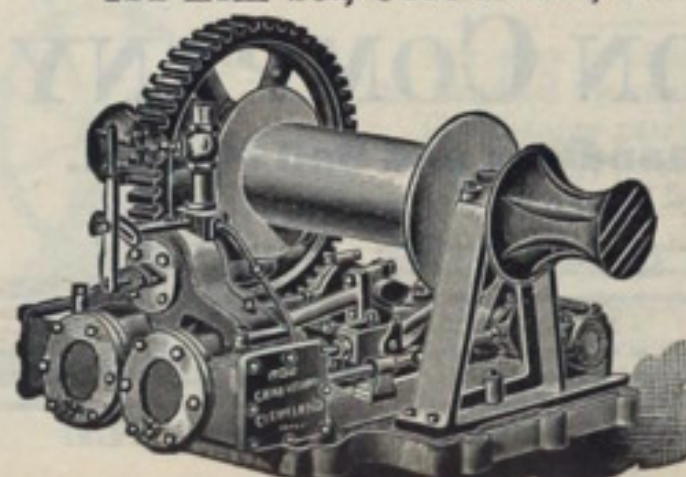
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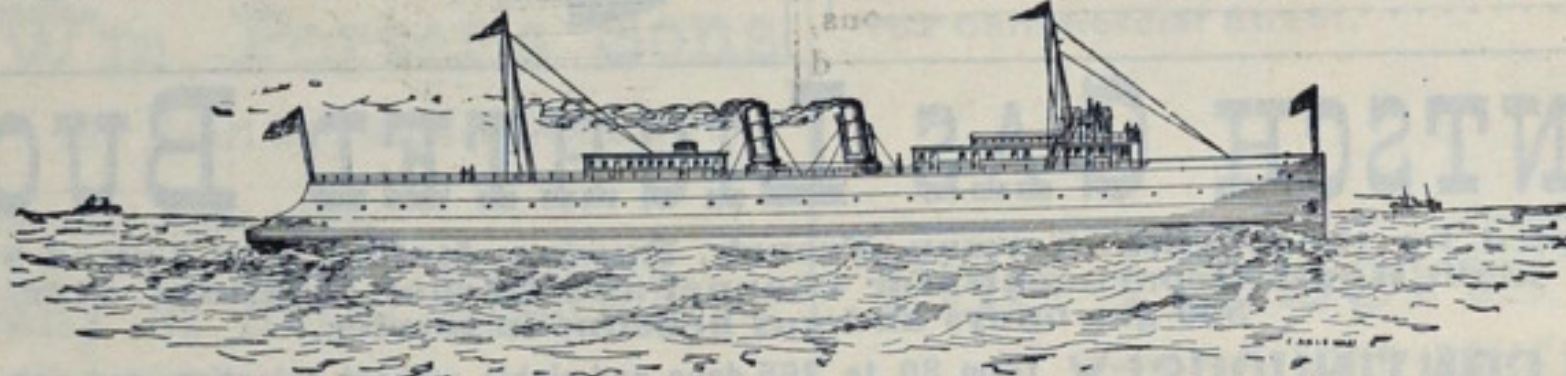
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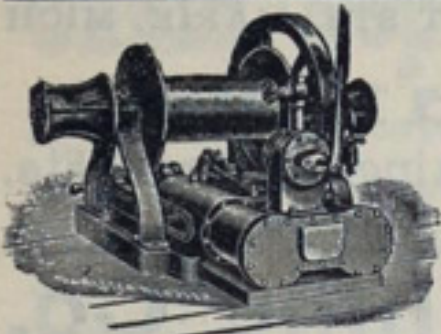
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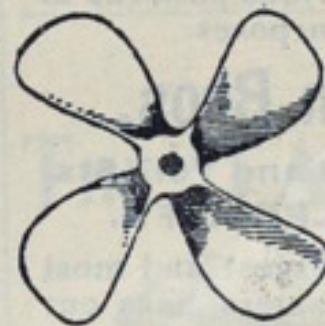
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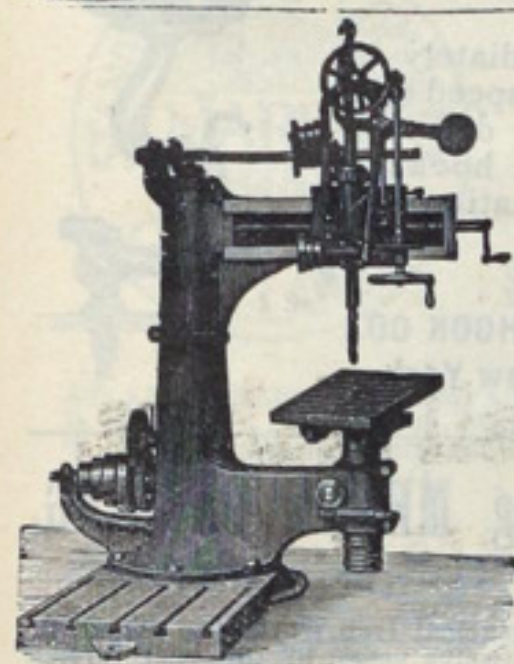
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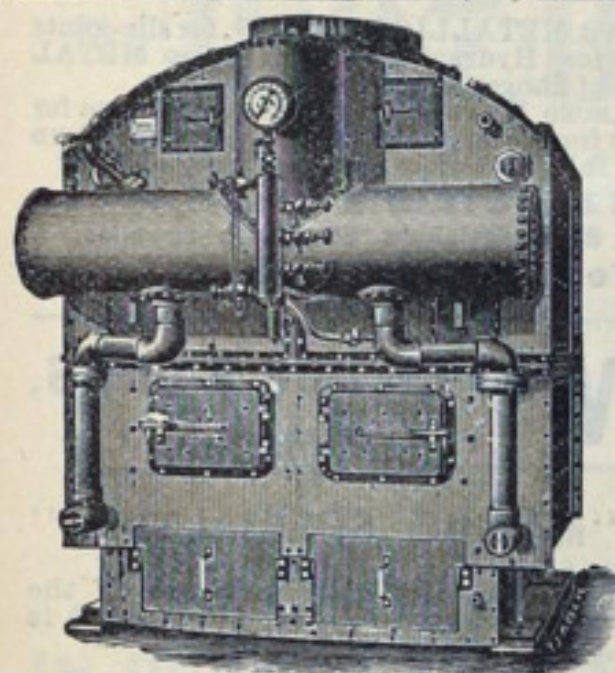
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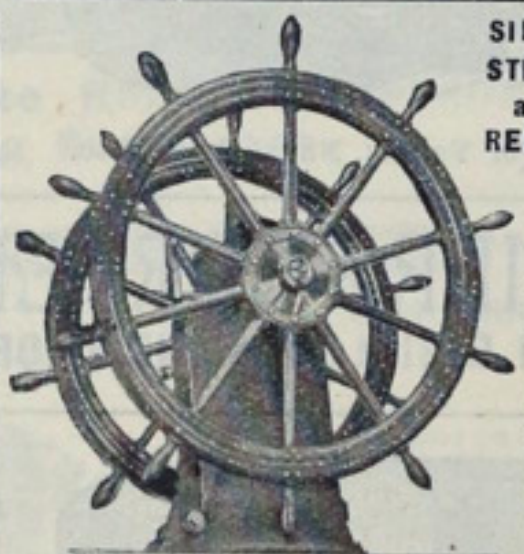
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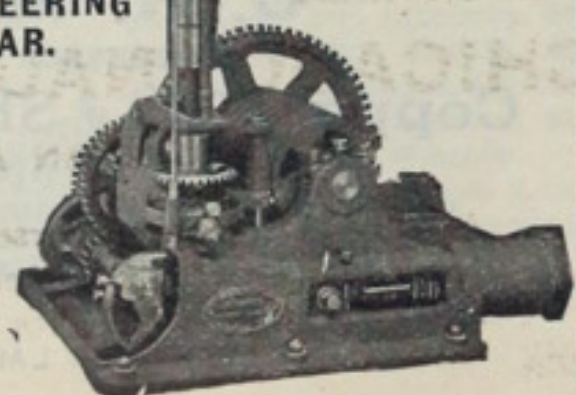


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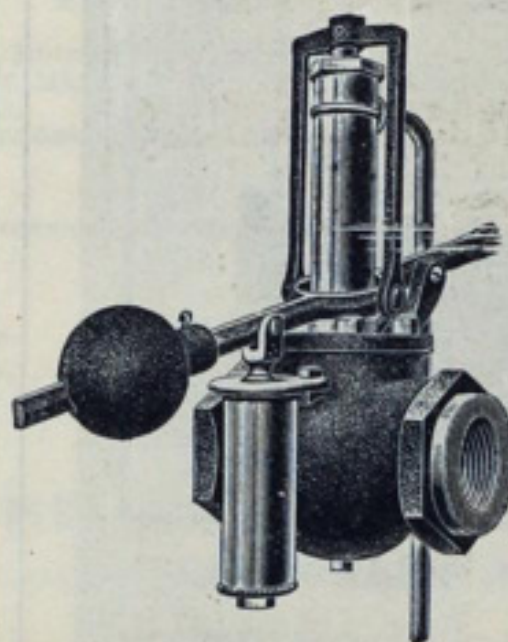
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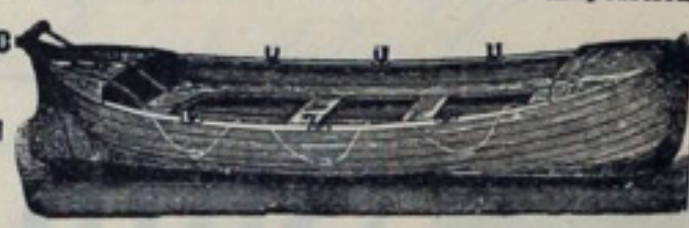
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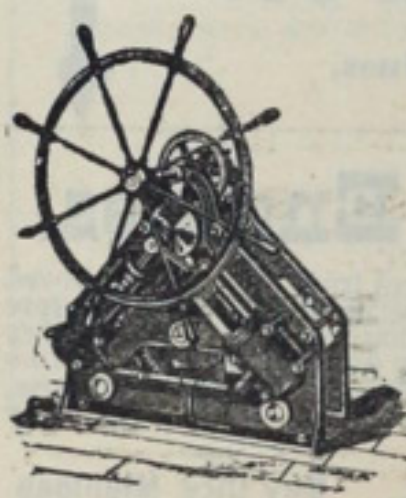
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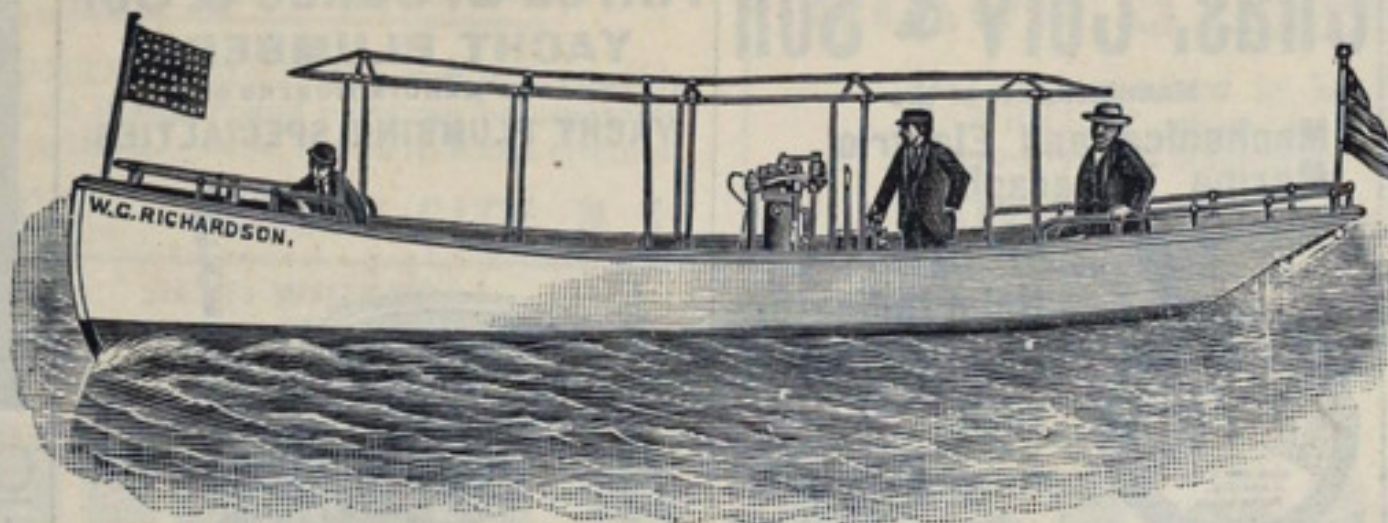


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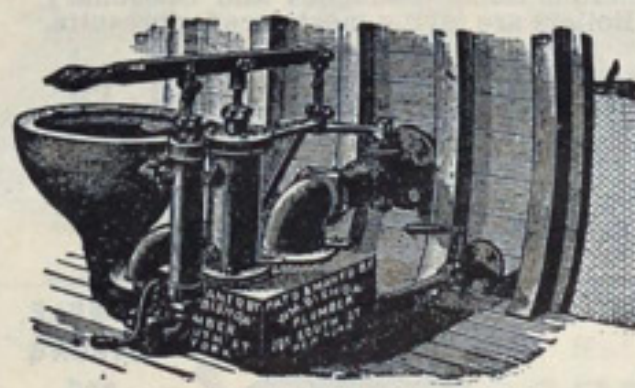
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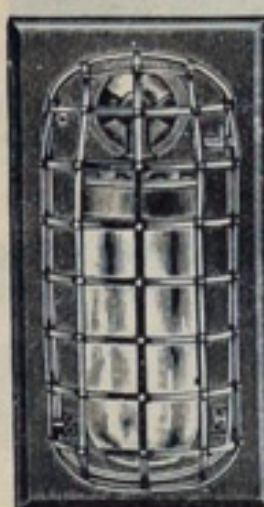
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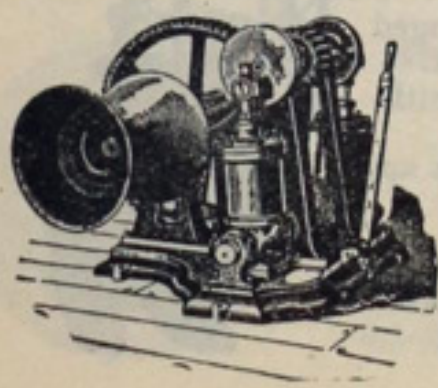
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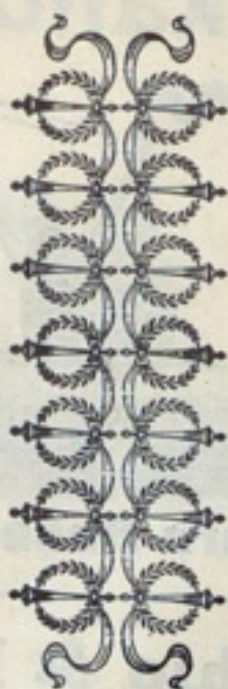
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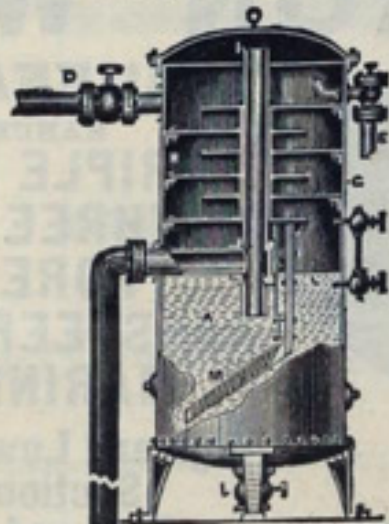
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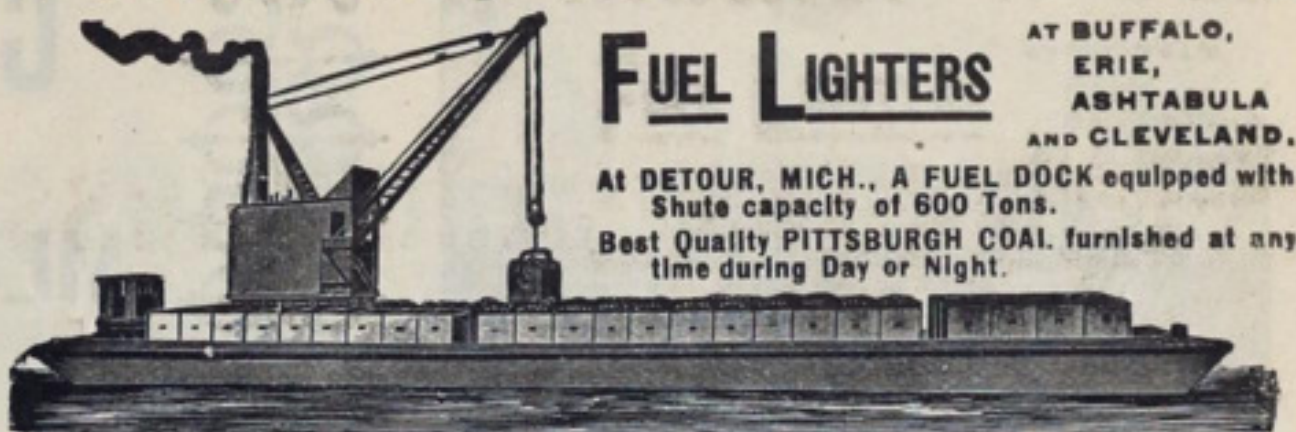
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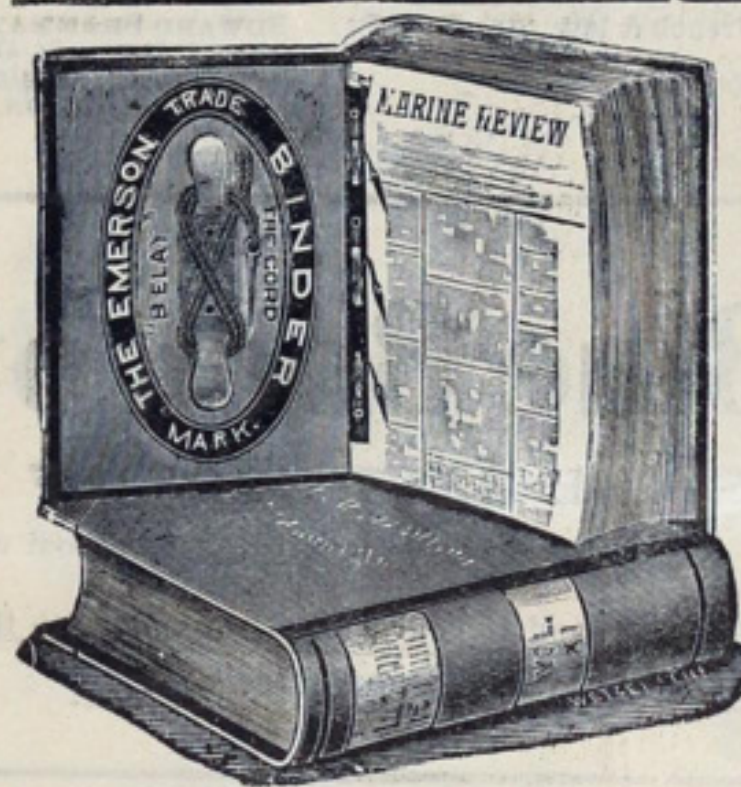
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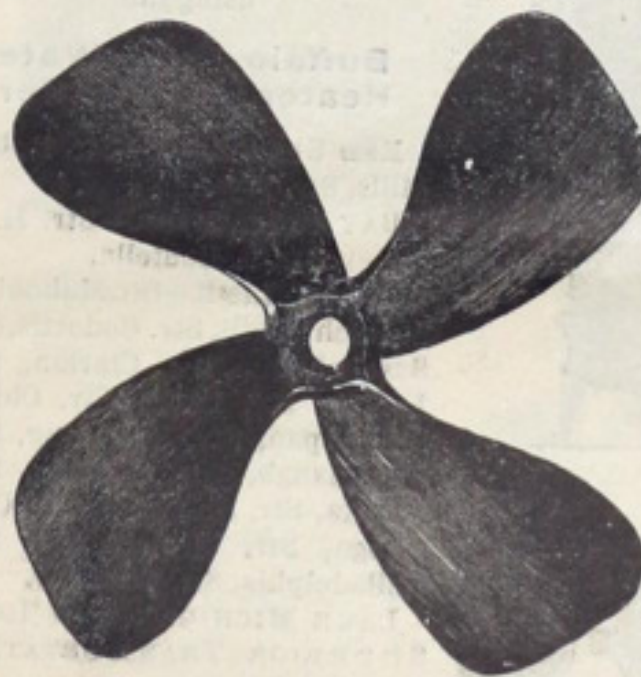
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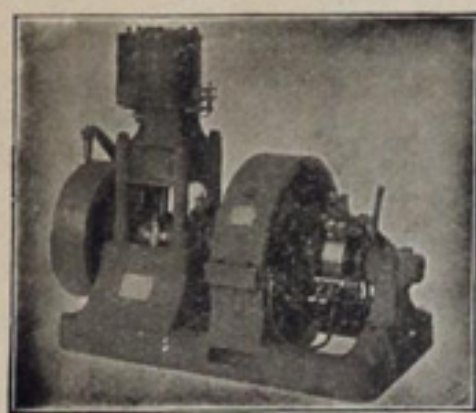
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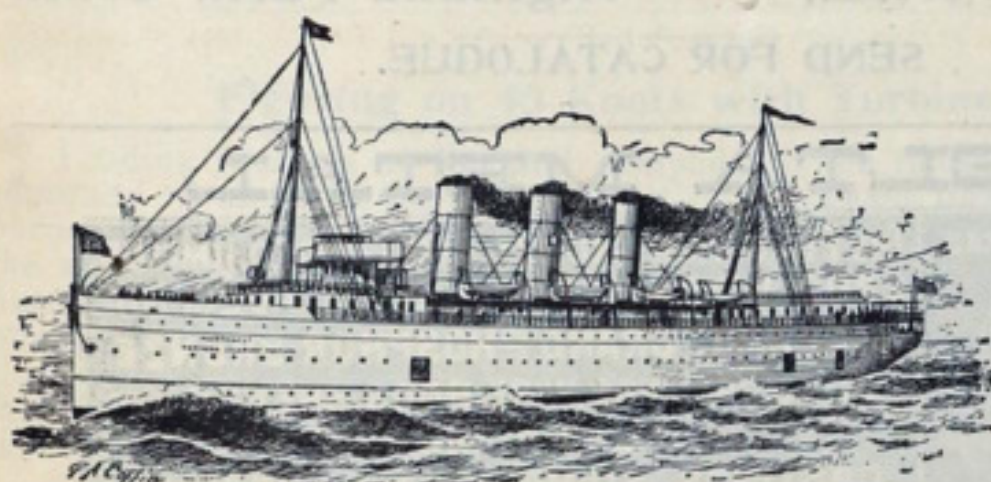
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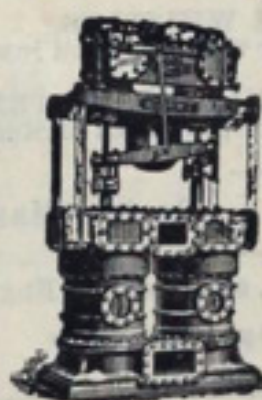
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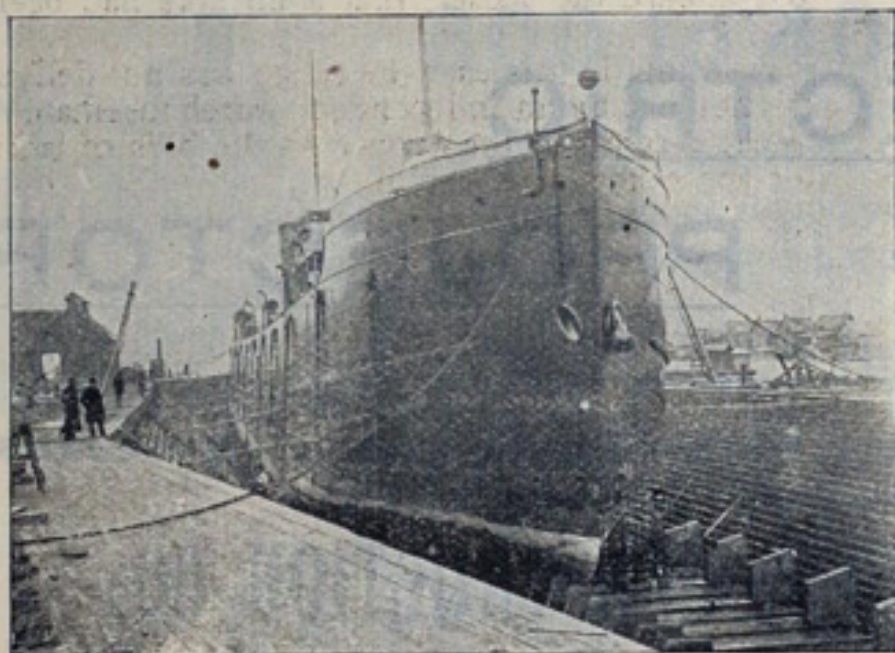
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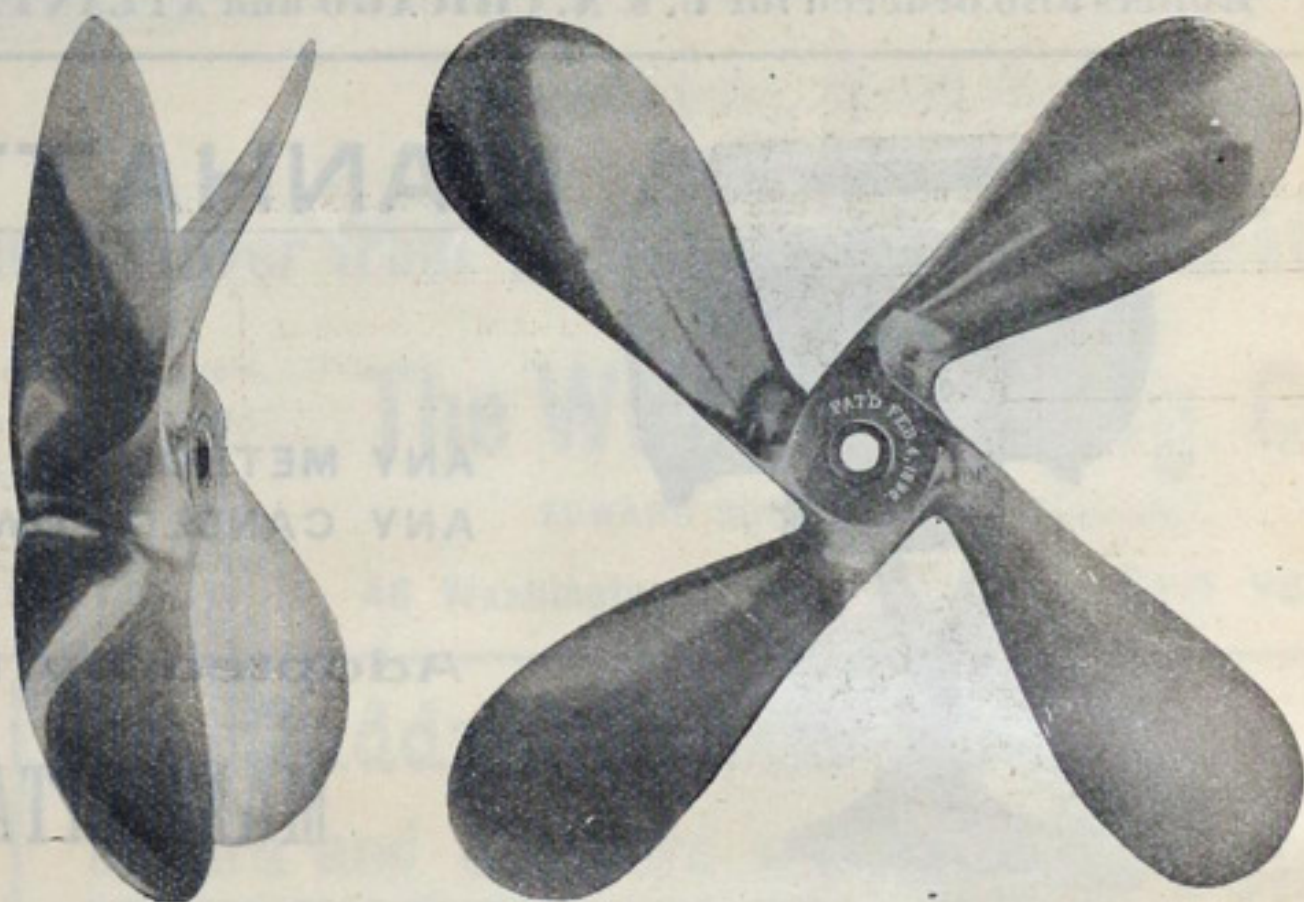
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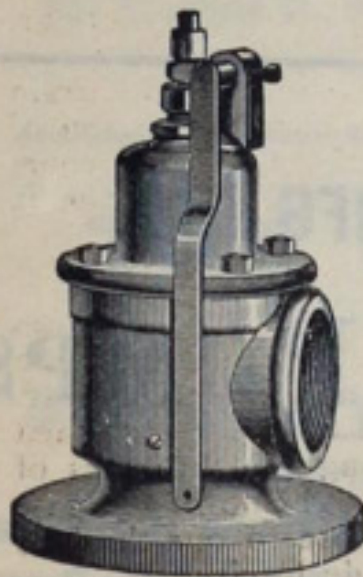
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